

FILE NO. SM-CTV-O-142

COLOR TELEVISION
SERVICE MANUAL

MODEL NO. 25D26MA/ 25D19MA/ PF25D19MA/

29D18MA/ PF29D18MA/ 29D99MA/

PF29D99MA/ 34D18MA/ PF34D8MA

CHASSIS NO. CH-10DR

Please read this manual carefully before service.

TABLE OF CONTENTS

SAFETY INSTRUCTIONS	1
ADJUSTMENTS	4
SYSTEM BLOCK DIAGRAMS AND ICS.....	13
SERVICE DATA	17
REPLACEMENT OF PARTS.....	50
APPENDIX 1. CIRCUIT DIAGRAMS	
2. PRINTED CIRCUIT BOARD LAYOUTS	
3. FINAL ASSEMBLY DIAGRAMS	
4. FINAL WIRING DIAGRAMS	

SAFETY INSTRUCTIONS AND MAINTENANCE

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" INSTRUCTIONS BELOW.

X-RAY RADIATION PRECAUTION

1. The EHT must be checked every time the TV is serviced to ensure that the CRT does not emit X-ray radiation as result of excessive EHT voltage. The maximum EHT voltage permissible in any operating circumstances must not exceed the rated value. When checking the EHT, use the High Voltage Check procedure in this manual using an accurate EHT voltmeter.
2. The only source of X-RAY radiation in this TV is the CRT. The TV minimizes X-RAY radiation, which ensures safety during normal operation. To prevent X-ray radiation, the replacement CRT must be identical to the original fitted as specified in the parts list.
3. Some components used in this TV have safety related characteristics preventing the CRT from emitting X-ray radiation. For continued safety, replacement component should be made after referring the PRODUCT SAFETY NOTICE below.
4. Service and adjustment of the TV may result in changes in the nominal EHT voltage of the CRT anode. So ensure that the maximum EHT voltage does not exceed the rated value after service and adjustment.

SAFETY PRECAUTION

WARNING: REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.

1. The TV has a nominal working EHT voltage. Extreme caution should be exercised when working on the TV with the back removed.
 - 1.1 Do not attempt to service this TV if you are not conversant with the precautions and procedures for working on high voltage equipment.
 - 1.2 When handling or working on the CRT, always discharge the anode to the TV chassis before removing the anode cap in case of electric shock.
 - 1.3 The CRT, if broken, will violently expel glass fragments. Use shatterproof goggles and take extreme care while handling.
 - 1.4 Do not hold the CRT by the neck as this is a very dangerous practice.
2. It is essential that to maintain the safety of the customer all power cord forms be replaced exactly as supplied from factory.
3. Voltage exists between the hot and cold ground when the TV is in operation. Install a suitable isolating transformer of beyond rated overall power when servicing or connecting any test equipment for the sake of safety.
4. When replacing ICs, use specific tools or a static-proof electric iron with small power (below 35W).
5. Do not use a magnetized screwdriver when tightening or loosening the deflection yoke assembly to

avoid electronic gun magnetized and decrement in convergence of the CRT.

6. When remounting the TV chassis, ensure that all guard devices, such as nonmetal control buttons, switch, insulating sleeve, shielding cover, isolating resistors and capacitors, are installed on the original place.
7. Replace blown fuses within the TV with the fuse specified in the parts list.
8. When replacing wires or components to terminals or tags, wind the leads around the terminal before soldering. When replacing safety components identified by the international hazard symbols on the circuit diagram and parts list, it must be the company-approved type and must be mounted as the original.
9. Keep wires away from high temperature components.

PRODUCT SAFETY NOTICE

CAUTION: FOR YOUR PROTECTION, THE FOLLOWING PRODUCT SAFETY NOTICE SHOULD BE READ CAREFULLY BEFORE OPERATING AND SERVICING THIS TV SET.

1. Do not slap or beat the cabinet or CRT, since this may result in fire or explosion.
2. Never allow the TV sharing a plug or socket with other large-power equipment. Doing so may result in too large load, thus causing fire.
3. Do not allow anything to rest on or roll over the power cord. Protect the power cord from being walked on, modified, cut or pinched, particularly at plugs.
4. Do not place any objects, especially heavy objects and lightings, on top of the TV set. Do not install the TV near any heat sources such as radiators, heat registers, stove, or other apparatus that produce heat.
5. Service personnel should observe the SAFETY INSTRUCTIONS in this manual during use and servicing of this TV set. Otherwise, the resulted damage is not protected by the manufacturer.
6. Many electrical and mechanical components in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-ray radiation protection afforded by them cannot necessarily be obtained by using replacements rated at higher voltages or wattage, etc. Components which have these special safety characteristics in this manual and its supplements are identified by the international hazard symbols on the circuit diagram and parts list. Before replacing any of these components read the parts list in this manual carefully. Substitute replacement components which do not have the same safety characteristics as specified in the parts list may create X-ray radiation.

Safety Symbol Description



The lightning symbol in the triangle tells you that the voltage inside this product may be

strong enough to cause an electric shock. Extreme caution should be exercised when working on the TV with the back removed.



This is an international hazard symbol, telling you that the components identified by the symbol have special safety-related characteristics.



FDA This symbol tells you that the critical components identified by the FDA marking have special safety-related characteristics.

UL This symbol tells you that the critical components identified by the UL marking have special safety-related characteristics.

MAINTENANCE

1. Place the TV set on a stable stand or base that is of adequate size and strength to prevent it from being accidentally tipped over, pushed off, or pulled off. Do not place the set near or over a radiator or heat register, or where it is exposed to direct sunlight.
2. Do not install the TV set in a place exposed to rain, water, excessive dust, mechanical vibrations or impacts.
3. Allow enough space (at least 10cm) between the TV and wall or enclosures for proper ventilation.
4. Slots and openings in the cabinet should never be blocked by clothes or other objects.
5. Please power off the TV set and disconnect it from the wall immediately if any abnormal condition are met, such as bad smell, belching smoke, sparkling, abnormal sound or no picture/sound/raster. Hold the plug firmly when disconnecting the power cord.
6. Unplug the TV set from the wall outlet before cleaning or polishing it. Use a dry soft cloth for cleaning the exterior of the TV set or CRT screen. Do not use liquid cleaners or aerosol cleaners.

ADJUSTMENTS

Set-up Adjustments

- The following adjustments should be made when a complete realignment is required or a new CRT is installed. Perform the adjustments in order as follows.

1. Colour purity
2. Convergence
3. White Balance

Note:

The purity/convergence magnet assembly and rubber wedges need mechanical positioning. Refer to Fig. 1, 2.

1. Colour Purity Adjustment

Note:

Before attempting any purity adjustment, the TV should be operated for at least 15 minutes.

- 1) Demagnetize the CRT and cabinet using a degaussing coil.
- 2) Set the brightness and contrast to maximum.
- 3) Receive the green raster pattern.
- 4) Loosen the clamp screw holding the deflection yoke and slide it backward or forward to display vertical green belt (zone) on the screen.
- 5) Remove the rubber wedge.
- 6) Rotate and spread the tabs of the purity magnet around the neck of the CRT until the green belt is on the center of the screen.
- 7) Slowly move the deflection yoke forward or backward until a uniform green screen is obtained.
Tighten the clamp screw of the yoke temporarily.
- 8) Check purity of the red and blue raster.

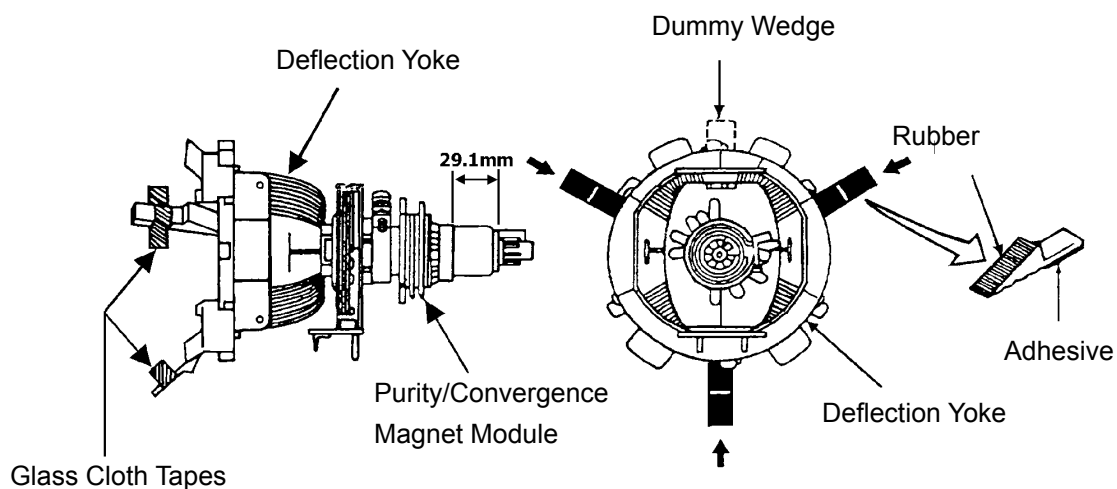


Fig. 1

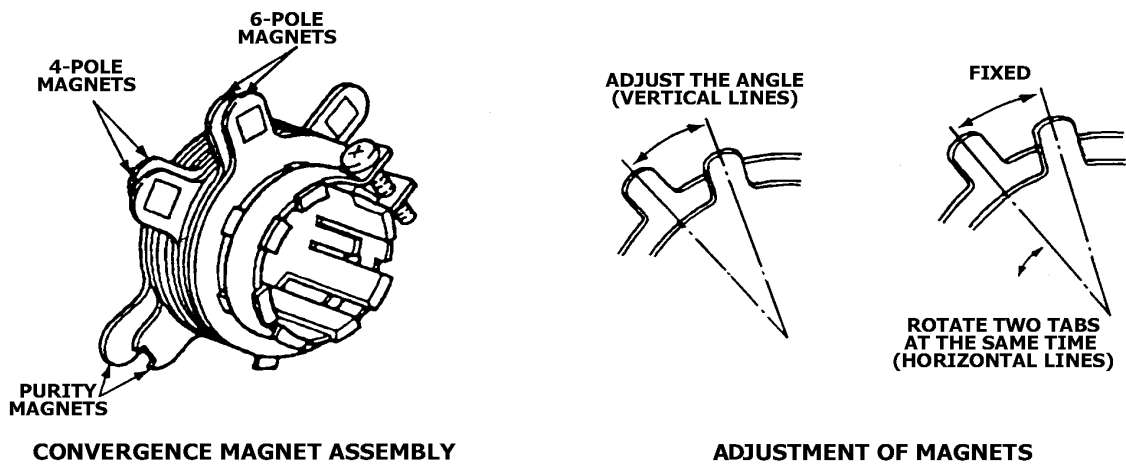


Fig. 2

2. Convergence Adjustment

Note:

Before attempting any convergence adjustment, the TV should be operated for at least 15 minutes.

- Center convergence adjustment
 - 1) Receive the cross hatch pattern.
 - 2) Set the brightness and contrast properly.
 - 3) Adjust two tabs of the 4-pole magnet to change the angle between them and red and blue vertical lines are superimposed on the center area of the screen.
 - 4) Turn both tabs at the same time keeping the angle constant to superimpose red and blue horizontal lines on the center of the screen.
 - 5) Adjust two tabs of 6-pole magnet to superimpose red/blue line and green line. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
 - 6) Repeat steps 3) ~ 5) keeping in mind red, green and blue movement. 4-pole magnet and 6-pole magnet interact each other, resulting in complicating and dot movement.
- Circumference convergence adjustment
 - 1) Loosen the clamping screw of the deflection yoke slightly to allow it to tilt.
 - 2) Temporarily put a wedge as shown in Fig.1.(Do not remove cover paper on adhesive part of the wedge.)
 - 3) Tilt front of the deflection yoke up or down to obtain better convergence in circumference.
Push the mounted wedge into the space between the CRT and yoke to fix the yoke temporarily.
 - 4) Put other wedge into bottom space and remove the cover paper to stick.
 - 5) Tilt front of the deflection yoke right or left to obtain better convergence in circumference.
 - 6) Keep the deflection yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on the CRT to fix the yoke.
 - 7) Detach the temporarily mounted wedge and put it in another upper space. Stick it on the CRT to fix the yoke.
 - 8) After fixing three wedges, recheck overall convergence.
Tighten the screw firmly to fix the yoke and check if the yoke is fixed.
 - 9) Stick three adhesive tapes on wedges as shown in Fig. 1.

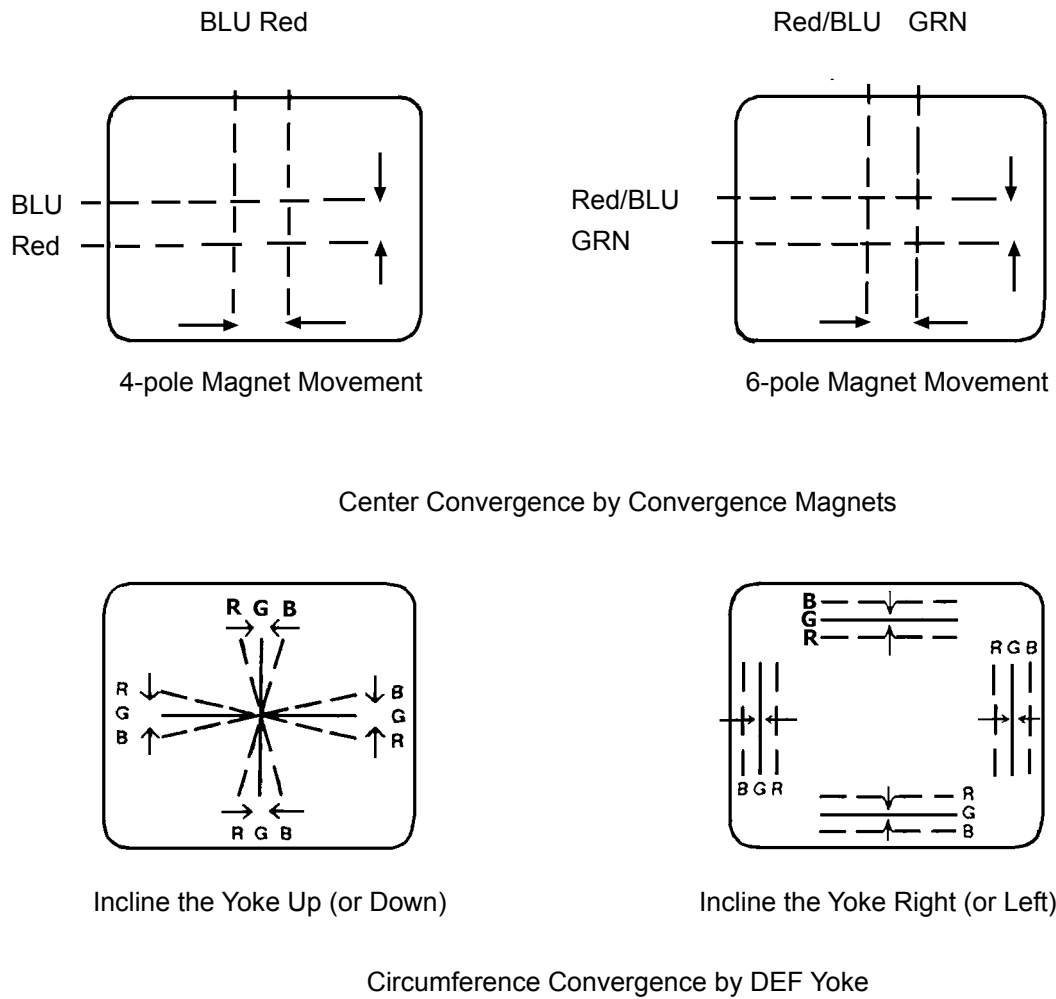


Fig. 3

Circuit Adjustments

1. General Description

All adjustments are thoroughly checked and corrected before the TV outgoing. Therefore the TV should operate normally and deliver proper colour pictures upon installation. However, several minor adjustments may be required depending on the particular location where the TV is operated.

This TV is shipped completely in carton. Carefully take out the TV from the carton and remove all packing materials. Connect the power cord into a 220V AC, 50Hz two-pin power outlet. Turn on the TV. Check and adjust all the customer controls such as brightness, contrast and colour to obtain natural colour pictures.

2. Automatic Degaussing

A degaussing coil is mounted around the CRT so that external degaussing after moving the TV is generally unnecessary, providing it is properly degaussed upon installation. The degaussing coil operates in about 1 second after power on. If the set is moved or faced to a different direction, the power switch must be switched off for at least 30 minutes in order that the automatic degaussing circuit operates properly. Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external-degaussing coil. Slowly move the degaussing coil around the screen, the sides and front of the TV and slowly withdraw the coil to a distance of about 2m before unplug it. If colour shading still exists, perform the Colour Purity Adjustment and Convergence Adjustment procedures.

3. Supply Voltage Adjustment

Caution: +B voltage has close relation to high voltage. To avoid X-ray radiation, +B voltage should be +135V.

- 1) Set AC power supply to $220\pm 5V$.
- 2) Connect a digital voltmeter to two pins of C878, and then turn on the TV.
- 3) Receive Philips pattern.
- 4) The voltmeter should read $135\pm 0.5V$ (For BCK-46A, BCK46D and BCK24306L series switch transformers) or $145\pm 1V$ (For BCK50, BCK25405L and BCK24307L series switch transformers).

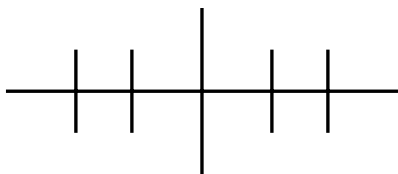
4. High Voltage Inspection

Caution: No high voltage adjustment should be done in the chassis.

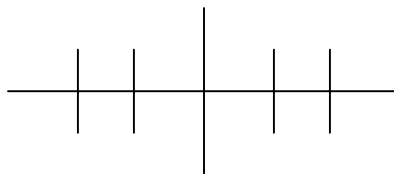
- 1) Connect a precise high voltmeter to the second anode of the CRT.
- 2) Turn on the TV and set the brightness and contrast to minimum (i.e. set beam current of the CRT to zero).
- 3) The high voltage tested should be $26.5\pm 1KV$ (for 25" CRT) or $28.5\pm 1KV$ (for 29" CRT) or $30.5KV\pm 1KV$ (for 34" CRT).
- 4) Set the brightness to minimum or maximum, and ensure high voltage not beyond limitation of 29 KV (for 25" CRT) or 31KV (for 29" CRT) or 35KV (for 34" CRT) in any case.

5. Focus Adjustment

- 1) Use the remote control to set the contrast to maximum and the brightness, chroma to medium.
- 2) Set H. V. lines near center of Philips pattern to thinnest with the FCB on the FBT. After finishing adjustment, ensure that no poor focusing exists near the center or around of the frame.



Before Adjusting




After Adjusting

Service Mode and Bus Data

1. To enter the D/S (Design/Service) mode

a. To enter the USER SERVICE mode

Set the volume to 0. Then press and hold the MUTE button on the remote control , and press the MENU button on the TV to enter the SERVICE mode. At this time, red "S" is displayed on the upper center of the screen. Use the  button on the remote control to turn off the TV. In this case , the SERVICE mode is quitted.

b. To select the SERVICE menu

Press the CAL button on the remote control to highlight two preset menus and 7 menus related to TDA884X and TDA9178 in turn.

c. To select and adjust data

Use the / buttons to highlight an adjustment and the / buttons to adjust. The adjusted data are immediately output and stored in the EEPROM.

Warning!

The user service mode adjustment can be changed only when service personnel adjust the whole set data during servicing. As the control data have dramatic effects on functions and performance of the TV, service personnel should not tell user how to enter the SERVICE mode to avoid improper data settings.

2. OPTION menu

Table 1 Option Menu

Item	Description	Bus Data
OPTION 1		
AV	AV terminals	Please refer to settings of your TV.
SOUND SYS	Sound system	DK
PIM	Picture improvement IC TDA9178: 1-Yes , 0-No	1
COMB	Comb filter TDA9181: 1-Yes , 0-No	0
SOU IC	Sound processing IC TDA9859: 1-Yes , 0-No	1
POW SET		0
LANGSET0	Language option 1	RUS
LANGSET1	Language option 2	ENG
OPTION 2		
WOOFER	Woofer: 1-Yes , 0-No	0
AUT-SET	Auto test: 1-On , 0-Off	1
R TIME	Realtime clock setup	0
BRAND	Brand	0
BLACK	Black screen	1
AV.-TV		0

3. ADJUST menu

Table 2 Adjustment Menu

Item	Description	Bus Data	Remarks
MENU 1			
AFW	AFC bandwidth selection	0	For inspection only
IF-FREQ	IF frequency	38	For inspection only
AFA	Auto frequency tracing display	IN	For inspection only
AFB	Auto frequency tracing display	ABOVE	For inspection only
AGC-TAK	AGC control data	10	Adjustable
FIX AUD	Fixed audio amplitude output	0	
VOL_MIN	Volume Min.	08	For inspection only
VOL_MID	Volume Mid.	27	For inspection only
VOL_016		43	For inspection only
MENU 2			
BRI-MAX	Brightness Max.	63	
BRI-MID	Brightness Mid.	31	
CON-MAX	Contrast Max.	63	
CON-MID	Contrast Mid.	31	
COL-MID	Color Mid.	31	
MENU 3			
		PAL NTSC	
V-HALF	Half vertical picture on/off	0	
V-SLOPE	Vertical shift	31	Set to optimum
V-AMPL	Vertical amplitude	34 37	Set to optimum
S-CORR	PAL vertical shift	26	Set to optimum
V-SHIFT	PAL vertical shift	24 27	Set to optimum
V-ZOOM	Vertical zoom	25	For inspection only
V-SCROLL	Vertical captions mode-SCROLL	31	For inspection only
MENU 4			
		PAL NTSC	Set to optimum
H-SHIFT	Horizontal shift	24 46	Set to optimum
H-AMPL	Horizontal amplitude	46 48	Set to optimum
H-PARAB	Pincushion correction	26	Set to optimum
H-CORNER	Quadrangle correction	38	Set to optimum
H-TRAP	Trapezoidal correction	34	Set to optimum
MENU 5			
R-DRV	Red drive setup	31	For inspection only
G-DRV	Green drive setup	31	
B-DRV	Blue drive setup	31	
Y-DLY	Brightness delay setup	8	For inspection only

(continued)

CL	Cathode voltage adjustment (1-BMCC CRT)	5	For inspection only
AKB	Auto dark balance adjusting switch	0	For inspection only
VSD	Vertical output switch	0	For inspection only
MENU 6			
CB	Color band pass filter IF selection	0	For inspection only
CMB	Color sub-carrier output switch Comb filter TD9181: 1-Yes , 0-No	1	
DS	Skin tone correction control: 1-On , 0-Off	1	
DSA	Skin tone correction angle: 1-Skin of eastern, 0-Skin of western	1	
HCO	Horizontal compensation	1	For inspection only
EVG	Vertical output guard switch	0	For inspection only
MENU 7			
CHROMA DELAY	Brightness/color transient improvement delay adjustment	3	For inspection only
BLACK STRETC	Black level stretching adjustment	16	For inspection only
NONLINEARI	Brightness linearity adjustment	32	For inspection only
VAR. GAMM	Vertical non-linearity adjustment	32	For inspection only
PEAKING	Peaking circuit	32	For inspection only
STEEPNESS	Steepness control	48	For inspection only
CORING	Coring circuit	32	For inspection only
LINE WIDTH	Line width adjustment	10	For inspection only
MENU 8			
ASK		1	For inspection only
DBL	Blue level stretching	1	For inspection only
GBL		1	For inspection only
DGR		1	For inspection only
GGR		1	For inspection only
WGR		0	For inspection only
SGR		1	For inspection only

Notes:

The data sheet may differ dependent on different models.

The data sheet may differ dependent on different CRTs for the same model.

4. Service Mode Adjustment

1) Sub-brightness

a) Receive colour signals.

b) Set the contrast to maximum and brightness to medium.

c) Set the chroma to medium.

Enter the TV to the Service mode. Select "SUB-BRIGHT" by pressing the / buttons on the remote control, and set the data to 31 by pressing the data adjustment buttons. Operate the TV for 5 minutes in the mode.

- d) Adjust the sub-bright data until blurry picture does not appear on the high bright area of the screen and too dim picture not on the low-bright area.
- e) Set the contrast and brightness to maximum or minimum, and then test normal picture alternation.
- f) If the picture does not become dark when the contrast and brightness are set to minimum, or not become bright when set to maximum, then adjust the sub-bright data to get normal picture.

2) White balance adjustment

- a) Turn on the TV and preheat it for over 7 minutes.
- b) Use the remote control to set the contrast to maximum and the brightness to medium. Set the chroma to minimum.
- c) Enter the TV to the Service mode, and set the following data without changing other items.

R-DRIVE.....70

G-DRIVE.....15

B-DRIVE.....70

- d) Pull out the external antenna and press the MUTE button once on the remote control until a right horizontal line appears on the screen. Adjust the R-DRV data to get $160V \pm 0.5$ green gun voltage across the CRT RGB PCB.
- e) Adjust the G-DRV and B-DRV data according to Step 4 so that the bright horizontal line turns to yellow, then to white.

3) Horizontal centering adjustment

Enter the TV to the Service mode and receive Philips pattern. Select "H.PH/60H" by pressing the / buttons on the remote control, and adjust horizontal picture position in the center of screen by pressing the data adjustment buttons.

4) Vertical centering adjustment

Enter the TV to the Service mode and receive Philips pattern. Select "V.POS/60H" by pressing the / buttons on the remote control, and adjust vertical picture position in the center of screen by pressing the data adjustment buttons.

5) Vertical amplitude adjustment

Enter the TV to the Service mode and receive cross hatch pattern. Select "V.SIZE/60H" by pressing the / buttons on the remote control, and adjust vertical amplitude by pressing the data adjustment buttons so that vertical amplitude is not enough. Continue to adjust vertical amplitude by pressing the data adjustment button until the first bar on the cross hatch pattern touches edge of the screen.

SYSTEM BLOCK DIAGRAMS AND KEY ICs

Block Diagram of Chassis

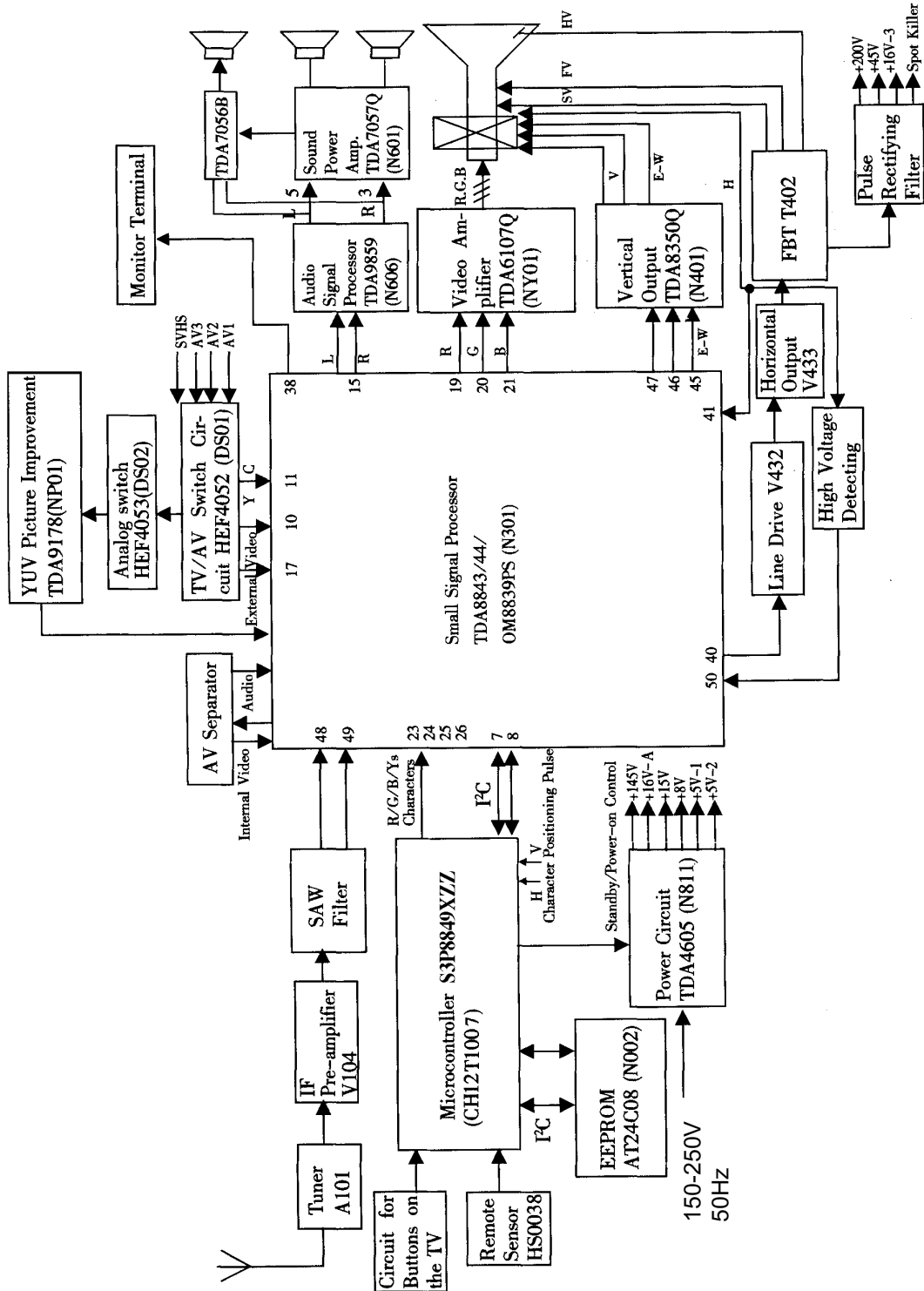
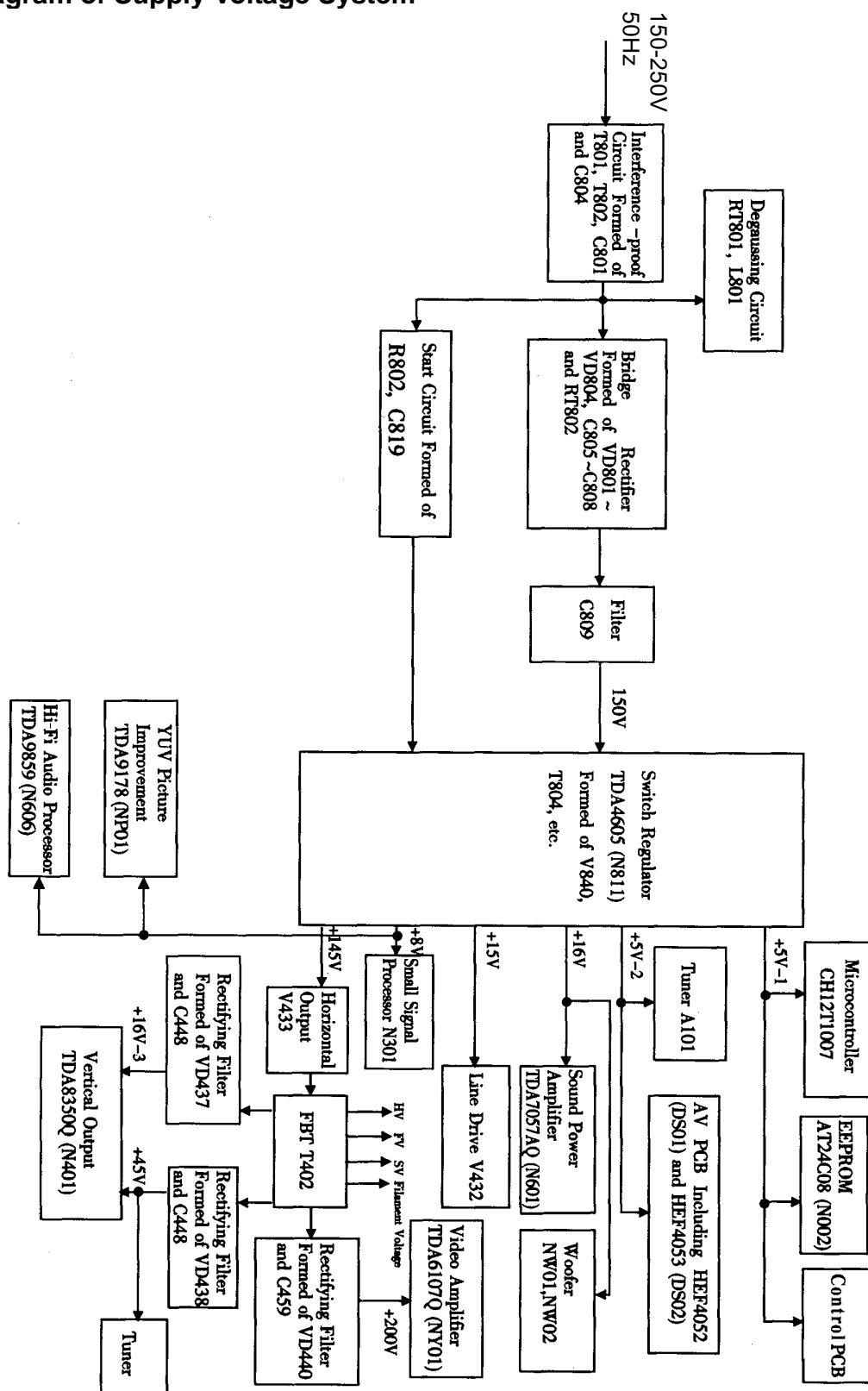


Fig. 4 Chassis Block Diagram



Block Diagram of Remote Control Structure

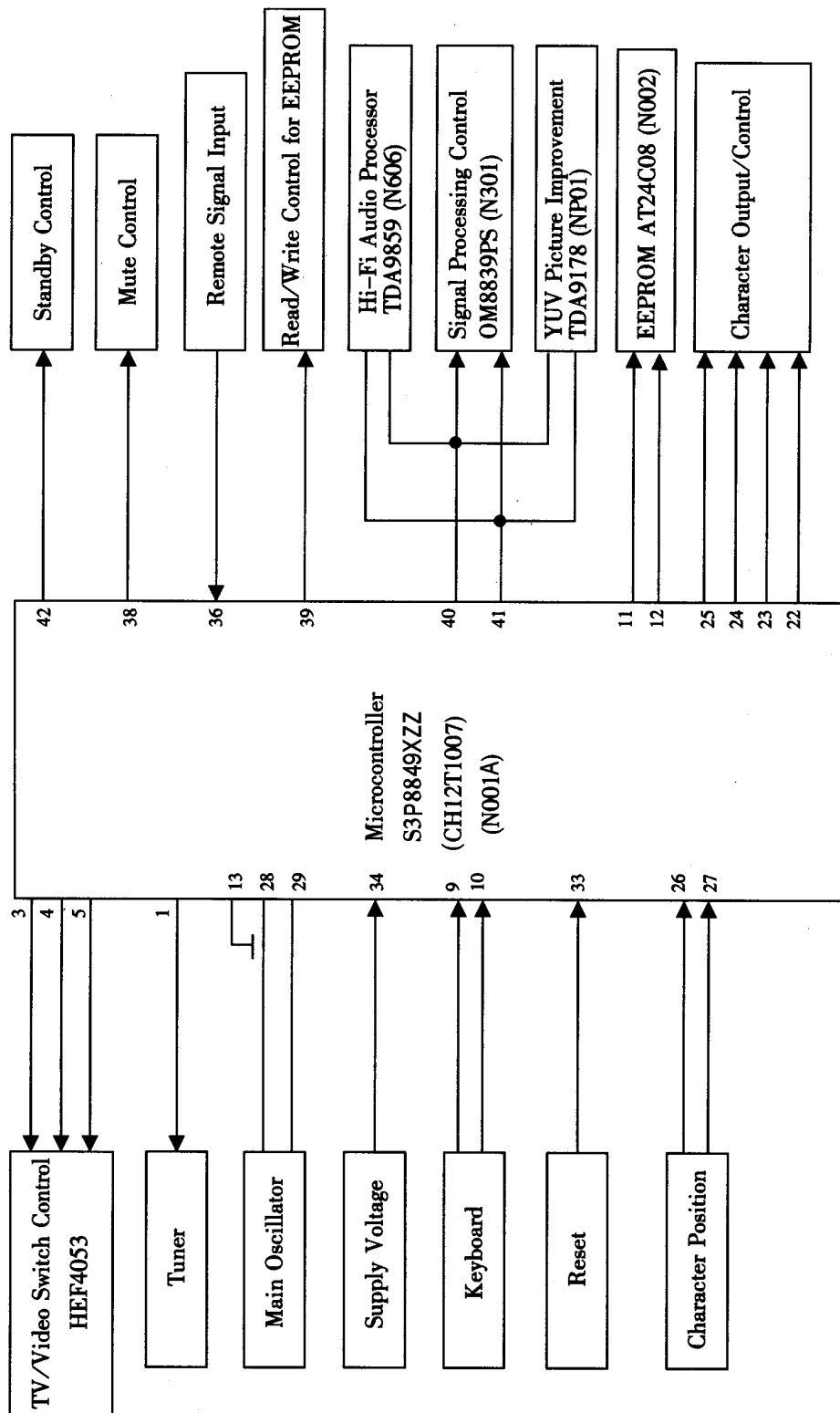


Fig. 6 Block Diagram of Remote Control Structure

Key ICs And Assemblies

Table 3 Key ICs and Assemblies

Serial No.	Position No.	Type	Function Description
1	N001A	CH12T1007 (S3P8849XZZ)	Microcontroller
2	N002	AT24C08	EEPROM
3	N301	TDA8844/OM8839PS	Small signal processor
4	N401	TDA8350Q	Vertical output circuit
5	N601	TDA7057AQ	Sound power amplifier
6	N606	TDA9859	Audio processor
7	N811	TDA4605	Power control circuit
8	NY01	TDA6108JF	Video amplifier
9	NW01	TDA7056B	Audio amplifier
10	NW02	TA75558P	Dual operational amplifier
11	DS01/DS02/NP02	HEF4053	Analog switch circuit
12	N602	HEF4052	Analog switch circuit
13	NP01	TDA9178	YUV picture improvement
14	A101	TDQ-5B6M	Tuner

SERVICE DATA

Technical Data of Key ICs

Power Control Circuit TDA4605

Control IC for Switched-Mode Power Supplies Using MOS-Transistor

1. Features

- Fold-back characteristics provide overload protection for external components
- Burst operation under secondary short-circuit condition implemented
- Protection against open or a short of the control loop
- Switch-off if line voltage is too low (under voltage switch-off)
- Line voltage depending compensation of fold-back point
- Soft-start for quiet start-up without noise generated by the transformer
- Chip-over temperature protection implemented (thermal shutdown)
- On-chip ringing suppression circuit against parasitic oscillations of the transformer
- AGC-voltage reduction at low load

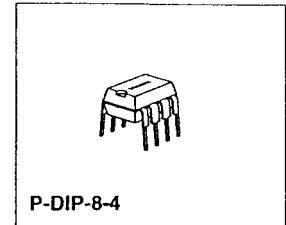


Fig.7

2. Block Diagram

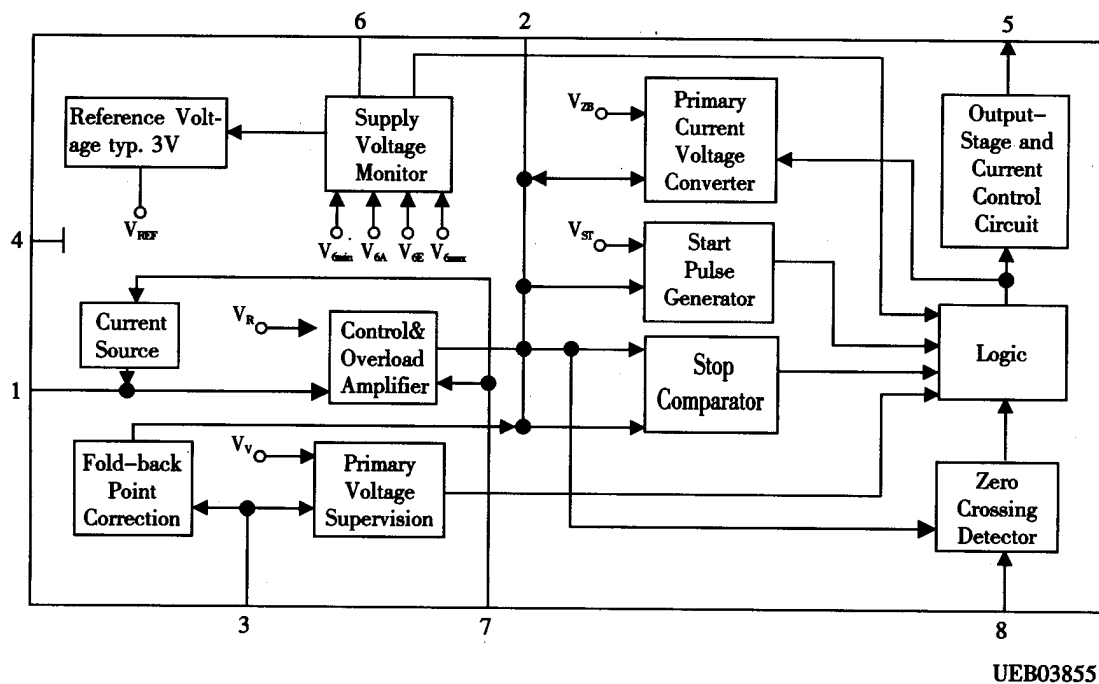


Fig. 8

3. Refer to Table 12 about Functions and Service Data of the IC's Pins.

Microcontroller S3P8849XZZ/CH12T1007**S3C8835/C8837/P8837/P8849**

The S3C8835 microcontroller has 16K bytes of on-chip program memory and the S3C8837 has 24K bytes. Both chips have a 272-byte general-purpose internal register file. The interrupt structure has seven interrupt sources with six interrupt vectors. The CPU recognizes six interrupt priority levels.

Using a modular design approach, the following peripherals were integrated with the SAM87 core to make the S3C8835/C8837/P8837/P8849 suitable for use in color television and other types of screen display applications:

- Four programmable I/O ports (26 pins total: 16 general-purpose I/O pins; 8 n-channel, open-drain output pins)
- 2 channel A/D converter (4-bit resolution)
- 14-bit PWM output (one channel: push-pull type)
- Basic timer (BT) with watchdog timer function
- One 8-bit timer/counter (T0) with interval timer
- One 8-bit general-purpose timer/counter (TA) with prescalers
- On-screen display (OSD) with a wide range of programmable features including halftone control signal output

1. Features**CPU**

- SAM87 CPU core

Memory

- 16-K byte (S3C8835) or 24K- byte (S3C8837) internal program memory
- 272-byte general-purpose register area

Instruction Set

- 78 instructions
- IDLE and STOP instructions added for powerdown modes

Instruction Execution Time

- 750 ns (minimum) with an 8-MHz CPU clock

Interrupts

- 7 interrupt sources with 6 vectors
- 6 interrupt levels
- Fast interrupt processing for select levels

General I/O

- Four I/O ports (26 pins total)
- Six open-drain pins for up to 6-volt loads
- Two open-drain pins for up to 5-volt loads

8-Bit Basic Timer

- Three selectable internal clock frequencies
- Watchdog or oscillation stabilization function

Timer/Counters

- One 8-bit timer/counter (T0) with three internal clocks and interval timer mode.

- One general-purpose 8-bit timer/counters with interval timer mode (timer A)

A/D Converter

- Two analog input pins; 4-bit resolution
- 3.125 μ s conversion time (8-MHz CPU clock)

Pulse Width Modulation Module

- 14-bit PWM with one-channel output (push-pull type)
- PWM counter and data capture input pin
- Frequency: 5.859 kHz to 23.437 kHz with a 6-MHz CPU clock

On-Screen Display (OSD)

- Video RAM: 252'12 bits
- Character generator ROM: 256 ' 18 ' 16 bits (256 display characters: fixed: 2, variable: 254)
- 252 display positions (12 rows ' 21 columns)
- 16-dot '18-dot character resolution
- 16 different character sizes
- Eight character colors
- Vertical direction fade-in/fade-out control
- Eight colors for character and frame background
- Halftone control signal output; selectable for individual characters
- Synchronous polarity selector for H-sync and V-sync input

Oscillator Frequency

- 5-MHz to 8-MHz external crystal oscillator
- Maximum 8-MHz CPU clock

Operating Temperature Range

- - 20°C to + 85°C

Operating Voltage Range

- 4.5 V to 5.5 V

Package Type

- 42-pin SDIP

2. Block Diagram

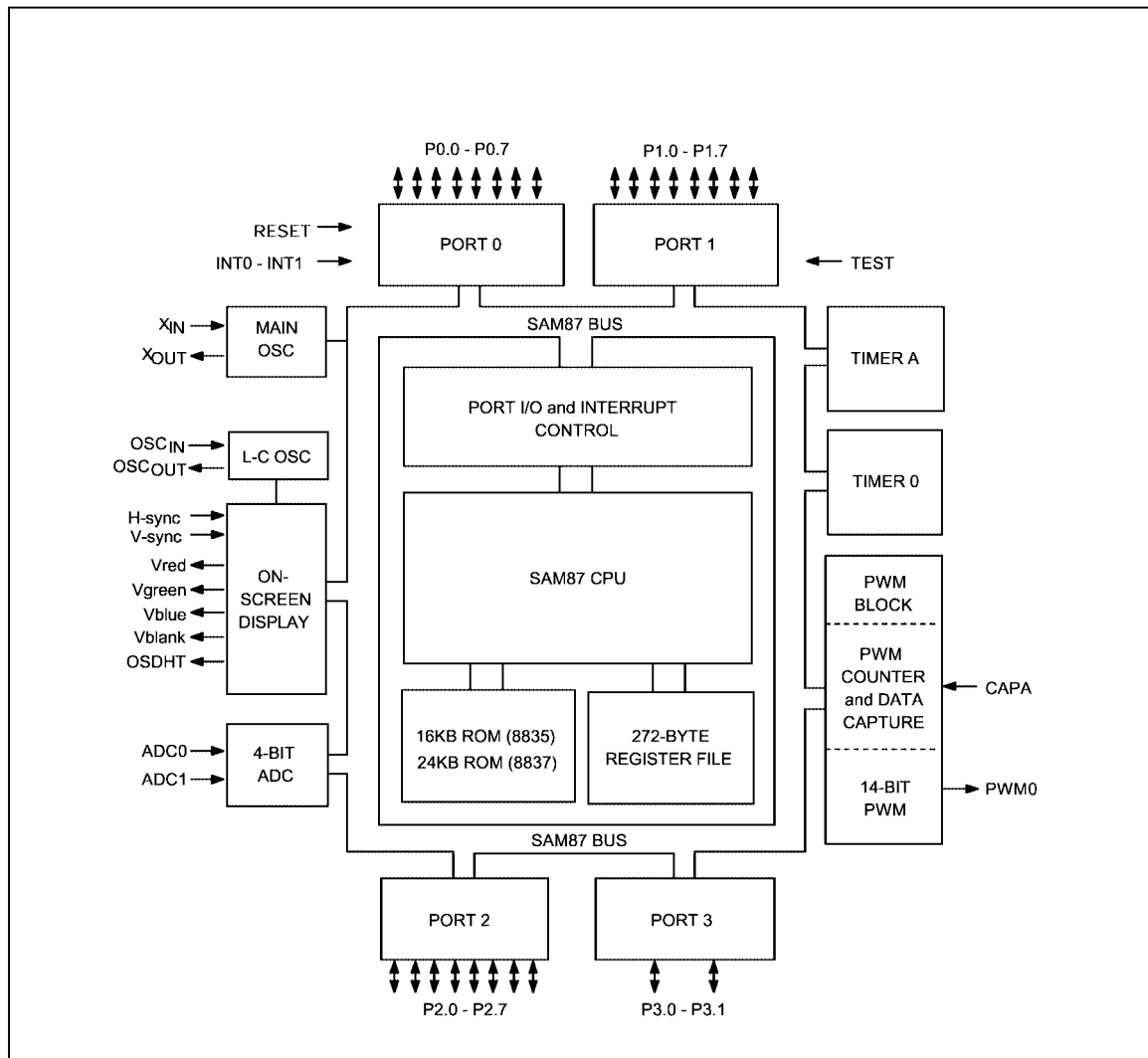


Fig.9 Block Diagram

3. Pin Assignments

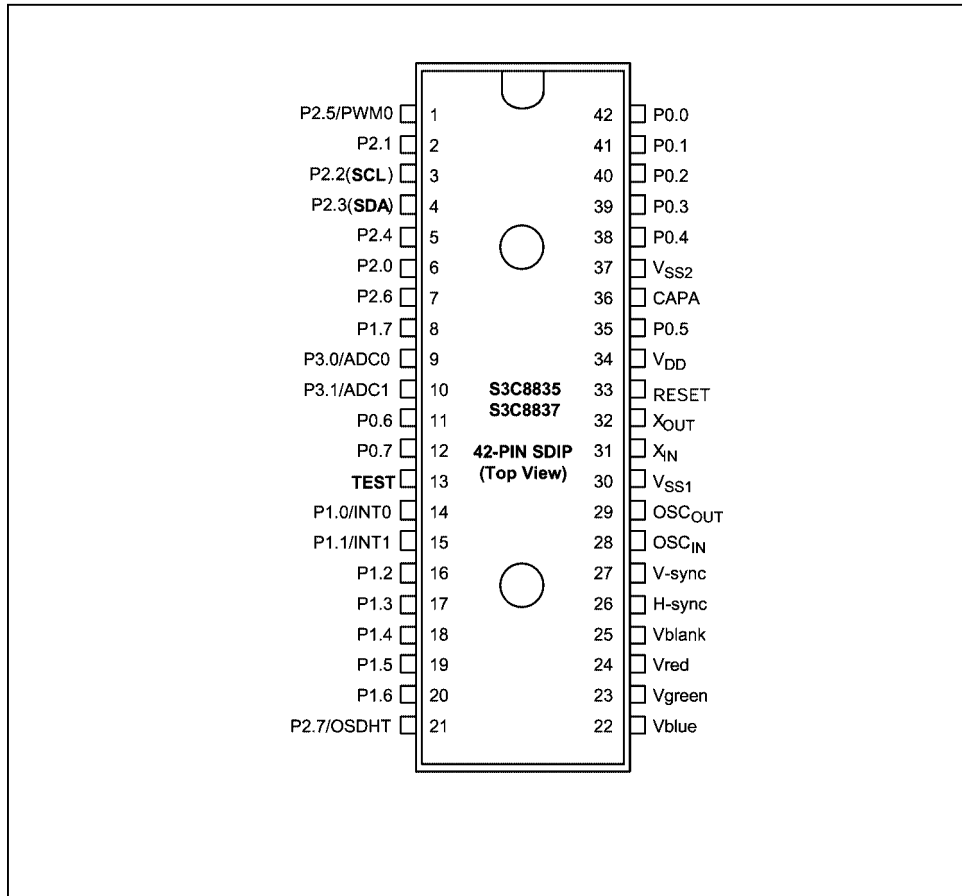


Fig.10 Pin Assignment Diagram

4. Pin Descriptions

Table 4

Pin Name	Pin Type	Pin Description	Circuit Type	Pin Numbers	Share Pins
P0.0–P0.7	I/O	General I/O port (8-bit), configurable for digital input or push-pull output.	3	11–12, 35, 38–42	
P1.0–P1.1	I/O	General I/O port (2-bit), configurable for digital input or n-channel open-drain output. P1.0–P1.1 can withstand up to 6-volt loads. Multiplexed for alternative use as external interrupt inputs INT0–INT1.	7	14–15	INT0–INT1
P1.2–P1.5		General I/O port (4-bit), configurable for digital input or n-channel open-drain output. P1.2–P1.5 can withstand up to 6-volt loads. High current port (10mA).	5	16–19	
P1.6–P1.7		General I/O port (2-bit), configurable for digital input or push-pull output.	3	20,8	
P2.0–P2.4, P2.6	I/O	General I/O port (6-bit). I/O mode or n-channel open-drain, push-pull output mode is software configurable. Pins can withstand up to 5-volt loads. P2.2: OTP serial clock pin P2.3: OTP serial data pin	2	2–7	
P2.5, P2.7		General I/O port (2-bit). I/O mode or n-channel open-drain, push-pull output mode is software configurable. Pins can withstand up to 5-volt loads. Each pin has an alternative function. P2.5: PWM0 (14-bit PWM output) P2.7: OSDHT (Halftone signal output)	2	1,21	PWM0 OSDHT
P3.0–P3.1	I/O	General I/O port (2 bits), configurable for digital input or n-channel open-drain output. P3.0–P3.1 can withstand up to 5-volt loads. Multiplexed for alternative use as external interrupt inputs ADC0–ADC1.	6	9–10	ADC0 ADC1
PWM0	O	Output pin for 14-bit PWM0 circuit	2	1	P2.5
ADC0–ADC1	I	Analog inputs for 4-bit A/D converter	6	9,10	P3.0–P3.1
INT0–INT1	I	External interrupt input pins	7	14,15	P1.0–P1.1
OSDHT	O	Halftone control signal output for OSD	2	21	P2.7
Vblue, Vgreen Vred, Vblank	O	Digital blue, green, red, and video blank signal outputs for OSD	4	22–25	–
H-sync	I	H-sync input for OSD	8	26	–
V-sync		V-sync input for OSD		27	
OSC _{IN} , OSC _{OUT}	I, O	L–C oscillator pins for OSD clock frequency generation	–	28,29	–
TEST	I	0 V: Normal operation mode 5 V: Factory test mode 12.5 V: OTP write mode	1	33	–
X _{IN} , X _{OUT}	I, O	System clock pins	–	31,32	–
RESET	I	System reset input pin	1	33	–
V _{DD} , V _{SS1} , V _{SS2}	–	Power supply pins	–	13	–
CAPA	I	Input for capture A module	8	26	–

5. Refer to Table 13 about Functions and Service Data of the IC's Pins

EEPROM AT24C08

1. Features

- Data EEPROM internally organized as 1024/2048 bytes and 64/128 pages×16 bytes
- Page protection mode, flexible page-by-page hardware write protection
- Additional protection EEPROM of 64/128 bits, 1 bit per data page
- Protection setting for each data page by writing its protection bit
- Protection management without switching WP pin
- Low power CMOS
- Vcc=2.7 to 5.5V operation
- Two wire serial interface bus, I²C-Bus compatible
- Filtered inputs for noise suppression with Schmitt trigger
- Clock frequency up to 400 kHz
- High programming flexibility
- Internal programming voltage
- Self timed programming cycle including erase
- Byte-write and page-write programming, between 1 and 16 bytes
- Typical programming time 6 ms (<10 ms) for up to 16 bytes
- High reliability
- Endurance 10⁶ cycles¹⁾
- Data retention 40 years¹⁾
- ESD protection 4000 V on all pins
- 8 pin DIP/DSO packages
- Available for extended temperature ranges
- Industrial: -40 to +85
- Automotive: -40 to +125

2. Pin Configuration

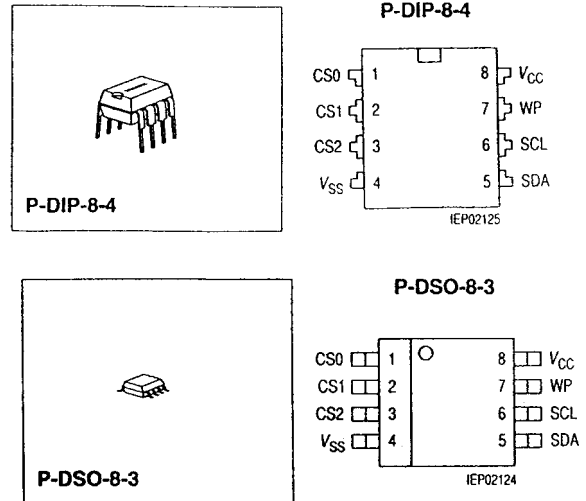


Fig. 11

3. Block Diagram

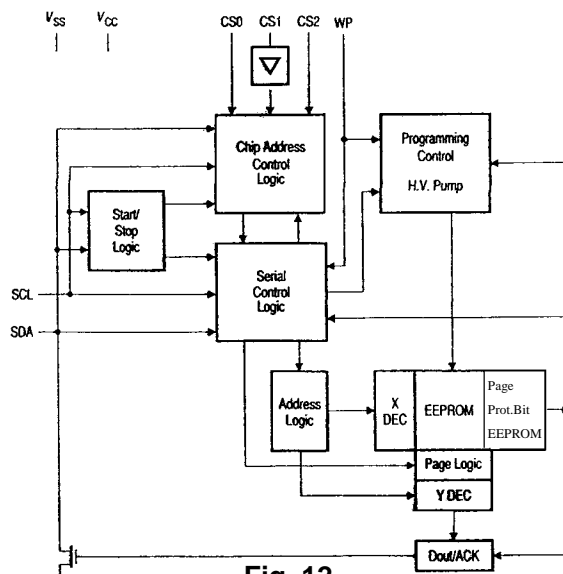


Fig. 12

4. Refer to Table 14 about Functions and Service Data of the IC's Pins.

I²C-bus Controlled PAL/NTSC/SECAM TV Processors OM8839PS/TDA8843/44**1. Features**

The following features are available in all ICs:

- Multi-standard vision IF circuit with PLL demodulator without external components.
- Alignment-free multi-standard FM sound demodulator (4.5 MHz to 6.5 MHz)
- Audio switch
- Flexible source selection with CVBS switch and Y(CVBS)/C input so that a comb filter can be applied
- Integrated chrominance trap circuit
- Integrated luminance delay line
- Asymmetrical peaking in the luminance channel with a (defeatable) noise coring function
- Black stretching of non-standard CVBS or luminance signals
- Integrated chroma band-pass filter with switchable centre frequency
- Dynamic skin tone control circuit
- Blue stretch circuit which offsets colors near white towards blue
- RGB control circuit with "Continuous Cathode Calibration" and white point adjustment
- Possibility to insert a "blue back" option when no video signal is available
- Horizontal synchronization with two control loops and alignment-free horizontal oscillator
- Vertical count-down circuit
- Vertical driver optimised for DC-coupled vertical output stages
- I²C-bus control of various functions

2. General Description

The various versions of the TDA884X/5X series are I²C-bus controlled single chip TV processors which are intended to be applied in PAL, NTSC, PAL/NTSC and multi-standard television receivers.

These ICs are nearly pin compatible with the TDA 837× TV processors but have a higher degree of integration because the delay line (TDA4665 function) and the SECAM decoder have been integrated. In addition to these functions some additional features have been added like "Continuous Cathode Calibration"(2-point black current loop which results in an accurate biasing of the 3 guns), adjustable luminance delay time, blue stretching and dynamic skin tone ("flesh") control.

Functionally the IC series is split up in 3 categories, viz

- Versions intended to be used in economy TV receivers with all basic functions (envelope: S-DIP 56 and QFP64)
- Versions with additional features like E-W geometry control, H-V zoom function and YUV interface which are intended for TV receivers with 110° picture tubes (envelope: S-DIP 56)
- Versions which have in addition a second RGB input with saturation control and a second CVBS output (envelope: QFP 64)

DC-coupled Vertical Deflection and East-West Output Circuit TDA8350Q

1. Features

- Few external components
- Highly efficient fully DC-coupled vertical output bridge circuit
- Vertical flyback switch
- Guard circuit
- Protection against:
 - short-circuit of the output pins
 - short-circuit of the output pins to V_P
- High EMC immunity due to common mode inputs
- Temperature (thermal) protection

- East-West output stage with one single conversion resistor.

2. General Description

The TDA8350Q is a power circuit for use in 90° and 110° color deflection systems for field frequencies of 50 to 120 Hz. The circuit provides a DC driven vertical deflection output circuit, operating as a highly efficient class G system and an East-West driver for sinking the diode modulator current.

3. Block Diagram

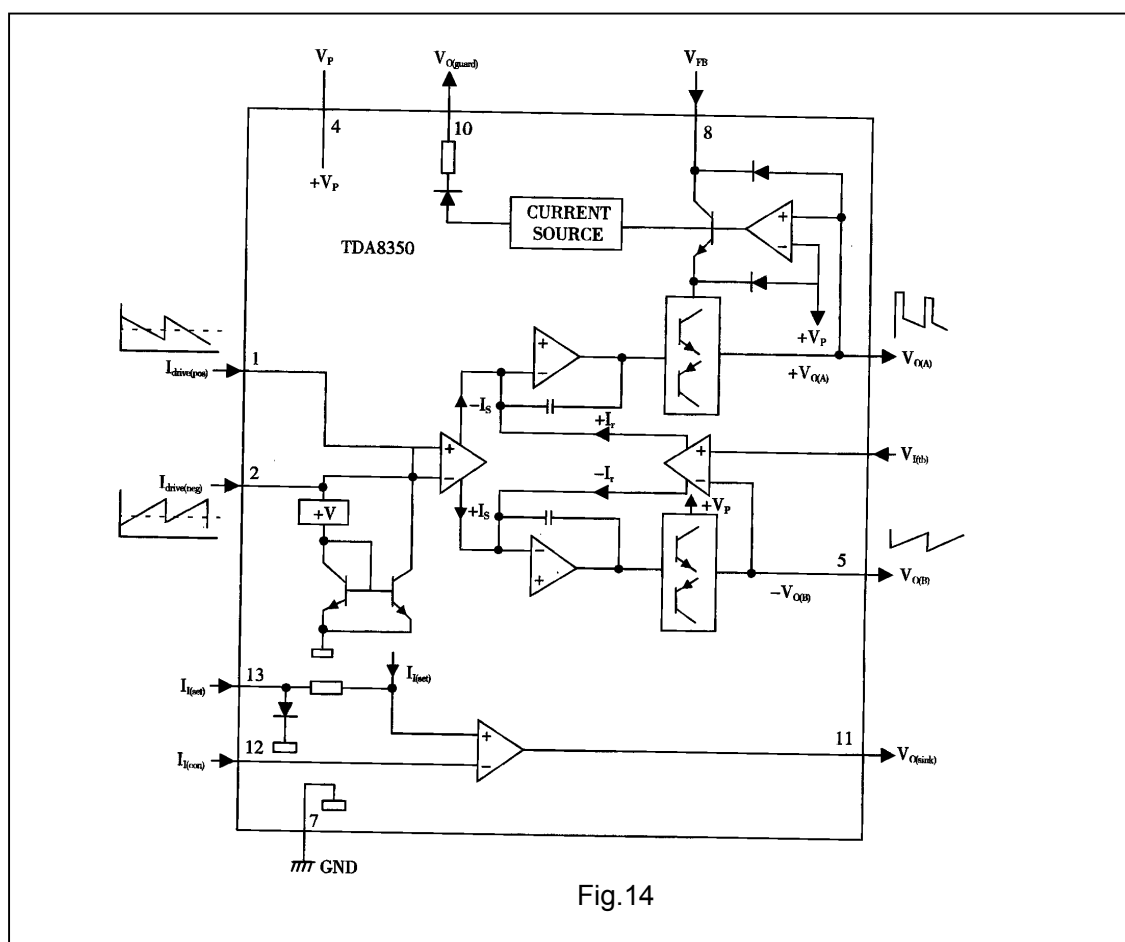


Fig.14

4. Refer to Table 16 about Functions and Service Data of the IC's Pins.

TDA7057AQ**2×8W Stereo BTL Audio Output Amplifier with DC Volume Control****1. Features**

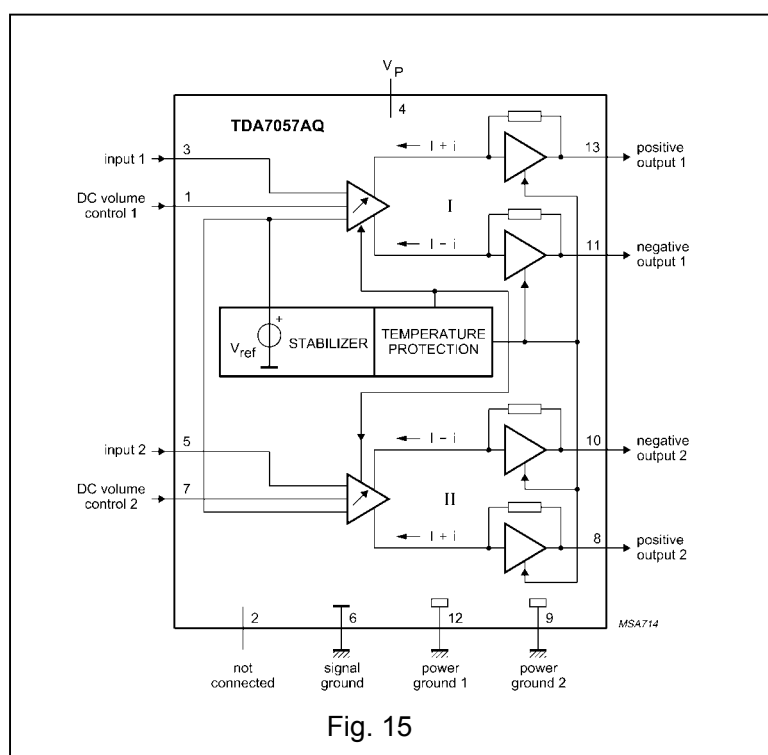
- DC volume control
- Few external components
- Mute mode
- Thermal protection
- Short-circuit proof
- No switch-on and switch-off clicks
- Good overall stability
- Low power consumption
- Low HF radiation
- ESD protected on all pins.

2. General Description

The TDA7057AQ is a stereo BTL output amplifier with DC volume control. The device is designed for use in TVs and monitors, but is also suitable for battery-fed portable recorders and radios.

Missing Current Limiter (MCL)

A MCL protection circuit is built-in. The MCL circuit is activated when the difference in current between the output terminal of each amplifier exceeds 100 mA (typical 300 mA). This level of 100 mA allows for single-ended headphone applications.

3. Block Diagram**4. Refer to Table 17 about Functions and Service Data of the IC's Pins.**

Triple Video Output Amplifier TDA6108JF/6107Q

1. Features

- Typical bandwidth of 9.0MHz (for TDA6108JF) or 5.5MHz (for TDA6107Q) for an output signal of 60 V (peak-to-peak value)
- High slew rate of 1850V/ μ s (for TDA6108JF) or 900V/ μ s (for TDA6107Q)
- No external components required
- Very simple application
- Single supply voltage of 200 V
- Internal reference voltage of 2.5 V
- Fixed gain of 51 (for TDA6108JF) or 50 (for TDA6107Q)

- Black-Current Stabilization (BCS) circuit
- Thermal protection.

2. General Description

The TDA6108JF includes three video output amplifiers in one plastic DIL-bent-SIL 9-pin medium power (DBS9MPF) package (SOT 111 -1), using high-voltage DMOS technology, and is intended to drive the three cathodes of a color CRT directly. To obtain maximum performance, the amplifier should be used with black-current control.

3. Ordering Information

Type Number	Package		
	Name	Description	Version
TDA6108JF/ TDA6107Q	DBS9MPF	Plastic DIL-bent-SIL medium power package with fin; 9 leads	SOT111-1

4. Block Diagram

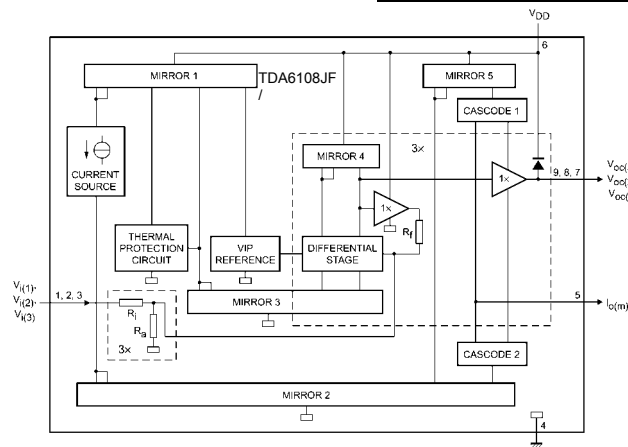


Fig. 16

5. Pinning

Table 5 Pinning

SYMBOL	PIN	DESCRIPTION
$V_{i(1)}$	1	Inverting input 1
$V_{i(2)}$	2	Inverting input 2
$V_{i(3)}$	3	Inverting input 3
GND	4	Ground (fin)
I_{om}	5	Black-current measurement output
V_{DD}	6	Supply voltage
$V_{oc(3)}$	7	Cathode output 3
$V_{oc(2)}$	8	Cathode output 2
$V_{oc(1)}$	9	Cathode output 1

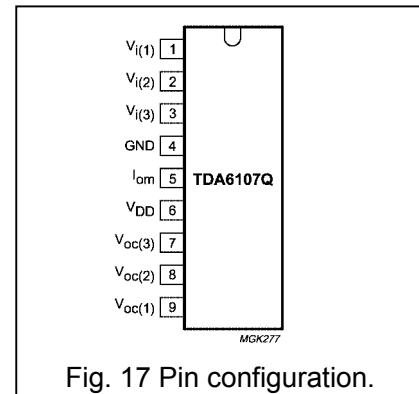


Fig. 17 Pin configuration.

6. Refer to Table 18 about Functions and Service Data of the IC's Pins.

Dual 4-channel Analog Multiplexer/Demultiplexer HEF4052

1. Description

The HEF4052 is a dual 4-channel analog multiplexer/demultiplexer with common channel select logic. Each multiplexer/demultiplexer has four independent inputs/outputs (Y_0 to Y_3) and a common input/output (Z). The common channel select logic includes two address inputs (A_0 and A_1) and an active LOW enable input (\overline{E}).

Both multiplexers/demultiplexers contain four bidirectional analog switches, each with one side connected to an independent input/output (Y_0 to Y_3) and the other side connected to a common input/output (Z).

With \overline{E} LOW, one of the four switches is selected (low impedance ON-state) by A_0 and A_1 . With \overline{E} HIGH, all switches are in the high impedance OFF-state, independent of A_0 and A_1 . V_{DD} and V_{SS} are the supply voltage connections for the digital control inputs (A_0 , A_1 and \overline{E}). The V_{DD} to V_{SS} range is 3 to 15 V. The analog inputs/outputs (Y_0 to Y_3 , and Z) can swing between V_{DD} as a positive limit and V_{EE} as a negative limit.

V_{DD} V_{EE} may not exceed 15 V.

For operation as a digital multiplexer/demultiplexer, V_{EE} is connected to V_{SS} (typically ground)

1. Block Diagrams

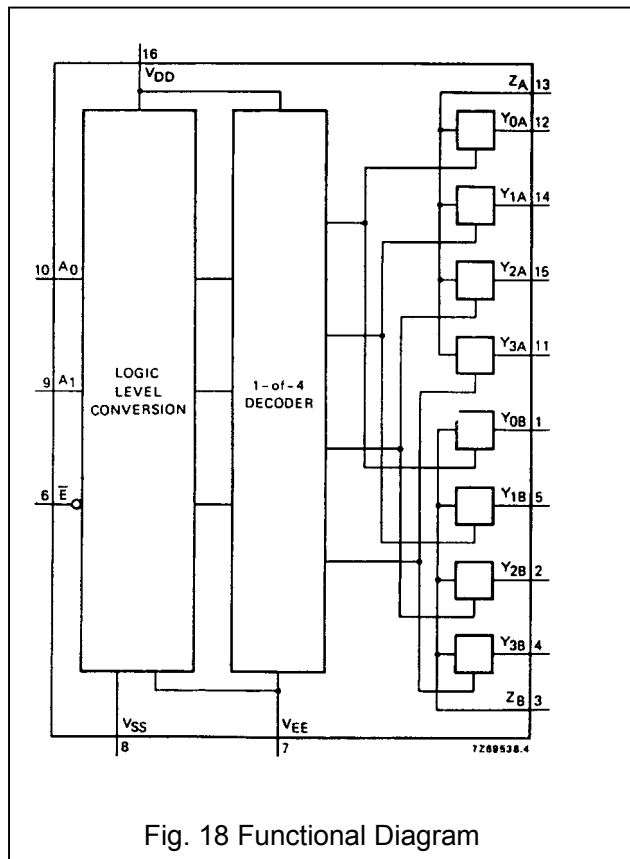


Fig. 18 Functional Diagram

Table 6 Pinning

Y_{0A} to Y_{3A}	Independent inputs/outputs
Y_{0B} to Y_{3B}	Independent inputs/outputs
A_0 A_1	Address inputs
\overline{E}	Enable input (active LOW)
Z_A Z_B	Common inputs/outputs

Family data, I_{DD} LIMITS category MSI

See Family Specifications

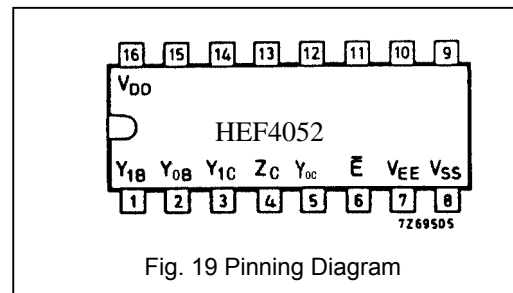


Fig. 19 Pinning Diagram

HEF4052P (N): 16-lead DIL; plastic (SOT38-1)

HEF4052D (F): 16-lead DIL; ceramic (cerdip) (SOT74)

HEF4052T (D): 16-lead SO; plastic (SOT109-1)

() : Package Designator North America

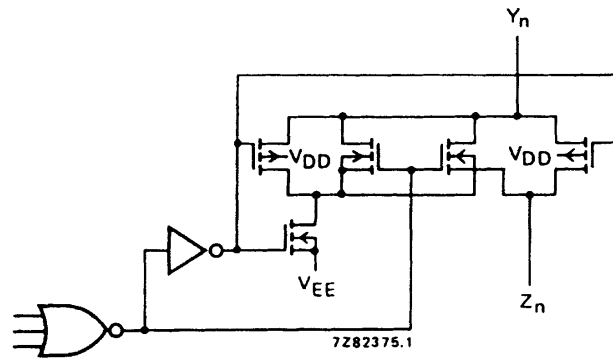


Fig. 20 Schematic Diagram (One Switch)

3. Function Table

Table 7

Inputs			Channel
E	A ₁	A ₀	On
L	L	L	Y _{0A} -Z _A ; Y _{0B} -Z _B
L	L	H	Y _{1A} -Z _A ; Y _{1B} -Z _B
L	H	L	Y _{2A} -Z _A ; Y _{2B} -Z _B
L	H	H	Y _{3A} -Z _A ; Y _{3B} -Z _B
H	X	X	none

Notes

H=HIGH state (the more positive voltage)

L=LOW state (the less positive voltage)

X=state is immaterial

Ratings

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Supply voltage (with reference to V_{DD}) V_{EE} -18 to +0,5 V

Note

To avoid drawing V_{DD} current out of terminal Z, when switch current flows into terminals Y, the voltage drop across the bidirectional switch must not exceed 0,4V. If the switch current flows into terminal Z, no V_{DD} current will flow out of terminals Y, in this case is no limit for the voltage drop across the switch, but the voltages at Y and Z may not exceed V_{DD} or V_{EE}

4. Refer to Table 19 about Functions and Service Data of the IC's Pins.

Triple 2-channel Analog Multiplexer/Demultiplexer HEF4053

1. Description

The HEF4053 is a triple 2-channel analog multiplexer/demultiplexer with a common enable input (\overline{E}). Each multiplexer/demultiplexer has two independent inputs/outputs (Y_0 and Y_1), a common input/output (Z), and select inputs (S_n). Each also contains two-bidirectional analog switches, each with one side connected to an independent input/output (Y_0 and Y_1) and the other side connected to a common input/output (Z).

With (\overline{E}) LOW, one of the two switches is (low impedance ON-state) by S_n . With \overline{E} HIGH,

selected all switches are in the high impedance OFF-state, independent of S_A to S_C .

V_{DD} and V_{SS} are the supply voltage connections for the digital control inputs (S_A to S_C and \overline{E}).

The V_{DD} to V_{SS} range is 3 to 15V. The analog inputs/outputs (Y_0 , Y_1 and Z) can swing between V_{DD} as a positive limit and V_{EE} as a negative limit. $V_{DD}-V_{EE}$ may not exceed 15 V.

For operation as a digital multiplexer/demultiplexer, V_{EE} is connected to V_{SS} (typically ground).

2. Block Diagram

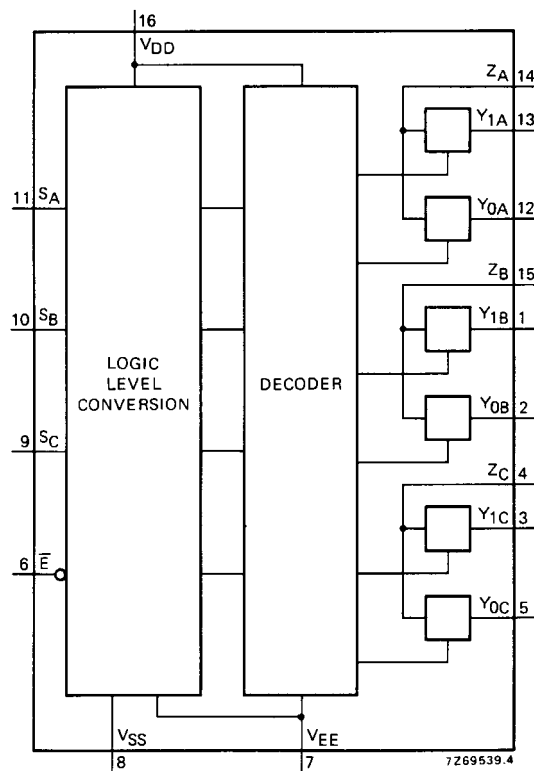


Fig. 21 Functional Diagram

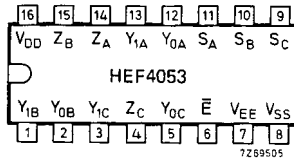


Fig. 22 Pinning Diagram

HEF4053P(N): 16-lead DIL ; plastic
(SOT38-1)

HEF4053D(F): 16-lead DIL; ceramic
(cerdip)
(SOT74)

HEF4053T(D): 16-lead S0; plastic
(SOT109-1)

(): Package Designator North America

Table 8 Pinning

Y_{0A} to Y_{0C}	Independent inputs/outputs
Y_{1A} to Y_{1C}	Independent inputs/outputs
S_A to S_C	Select inputs
E	Enable input (active LOW)
Z_A to Z_C	Common inputs/outputs

Table 9 Function Table

Inputs		Channel
E	S_n	O_n
L	L	$Y_{0n}-Z_n$
L	H	$Y_{1n}-Z_n$
H	X	none

Notes

H=HIGH state (the more positive voltage)

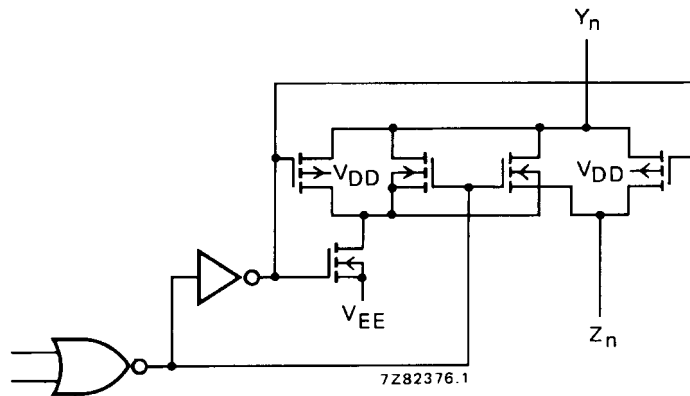


Fig. 23 Schematic Diagram (One Switch)

Ratings

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Supply voltage (with reference to V_{DD}) V_{EE} -18 to +0,5 V

Note

To avoid drawing V_{DD} current out of terminal Z, when switch current flows into terminals Y, the voltage drop across the bidirectional switch must not exceed 0,4 V. If the switch current flows into terminal Z, no V_{DD} current will flow out of terminals Y, in this case there is no limit for the voltage drop across the switch, but the voltages at Y and Z may not exceed V_{DD} or V_{EE} .

3. Refer to Table 20 about Functions and Service Data of the IC's Pins.

5 W Mono BTL Audio Amplifier with DC Volume Control TDA7056B

1. Features

- DC volume control
- Few external components
- Mute mode
- Thermal protection
- Short-circuit proof
- No switch-on and switch-off clicks
- Good overall stability
- Low power consumption
- Low HF radiation
- ESD protected on all pins.

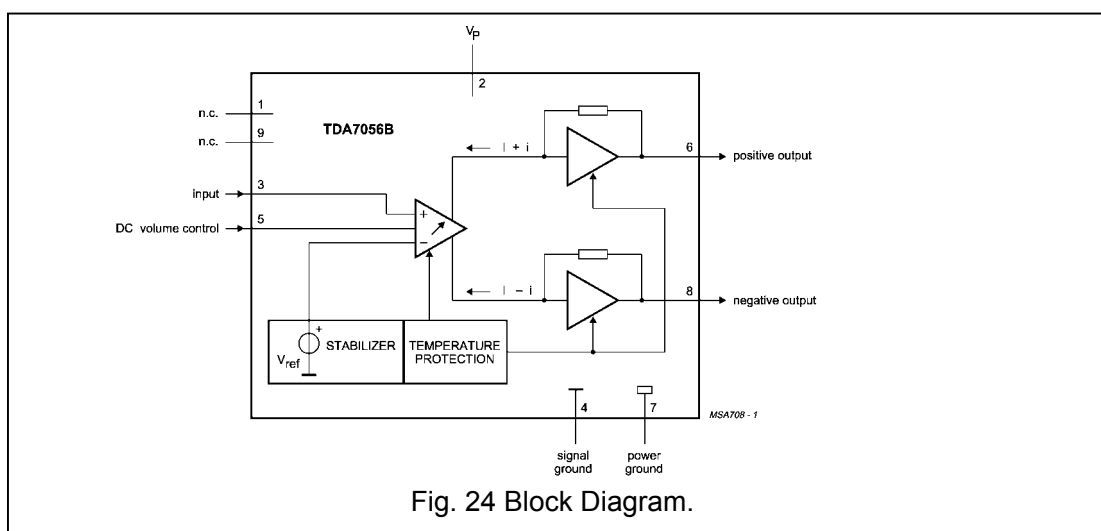
2. General Description

The TDA7056B is a mono Bridge-Tied Load (BTL) output amplifier with DC volume control. It is designed for use in TV and monitors, but is also suitable for battery-fed portable recorders and radios.

The device is contained in a 9-pin medium power package.

A Missing Current Limiter (MCL) is built in. The MCL circuit is activated when the difference in current between the output terminal of each amplifier exceeds 100 mA (300 mA typ.). This level of 100 mA allows for headphone applications (single-ended).

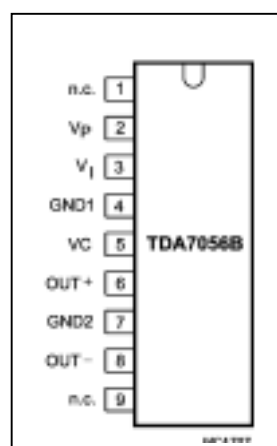
3. Block Diagram



4 . Pinning

Table 10 Pinning

Symbol	Pin	Description
n.c.	1	Not connected
VP	2	Positive supply voltage
VI	3	Voltage input
GND1	4	Signal ground
VC	5	DC volume control
OUT+	6	Positive output
GND2	7	Power ground
OUT-	8	Negative output
n.c.	9	Not connected



5. Refer to Table 21 about Functions and Service Data of the IC's Pins.

Dual Operational Amplifier TA75558P

The TA75558P, TA75558S and TA75558F are Low-Noise Operational Amplifiers with High Speed and Wide Bandwidth.

1. Features

- Internal Frequency Compensation Type
- Pin Compatible with TA75558P, TA75558S and TA75558F
- Possible to Exchange the Position of 9 Pin for 1 Pin Because of Pin Connection Being Symmetric. (TA75558S Device Only)
- Wide Band Range; $f_T=3\text{MHz(Typ.)}$
- Suitable Application for Active Filter Equalizer Amplifier and Headphone Amplifier.

2. Pin Connection (top view)

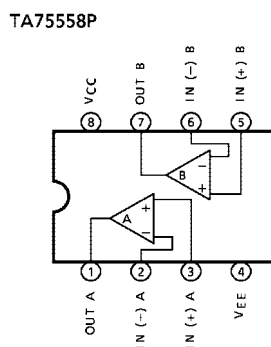


Fig. 26

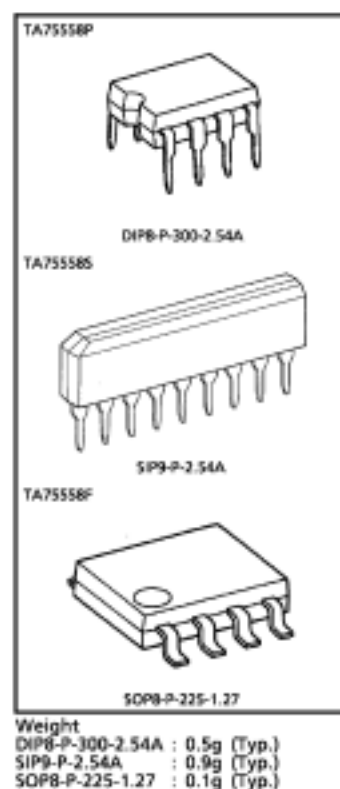


Fig. 27

3. Equivalent Circuit

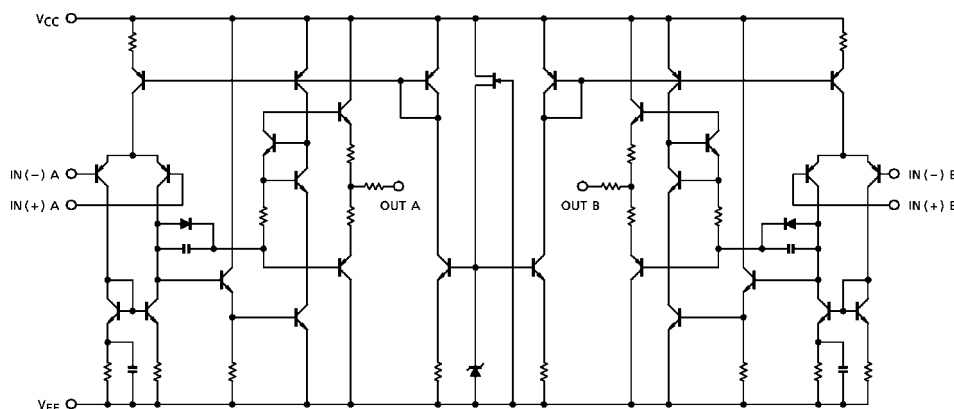


Fig. 28

3. Refer to Table 22 about Functions and Service Data of the IC's Pins.

Universal Hi-Fi Audio Processor for TV TDA9859

1. Features

- Multi-source selector switches six AF inputs (three stereo sources or six mono sources).
- Each of the input signals can be switched to each of the outputs (crossbar switch).
- Outputs for loudspeaker channel and peri-TV connector (SCART).
- Switchable spatial stereo and pseudo stereo effects
- Audio surround decoder can be added

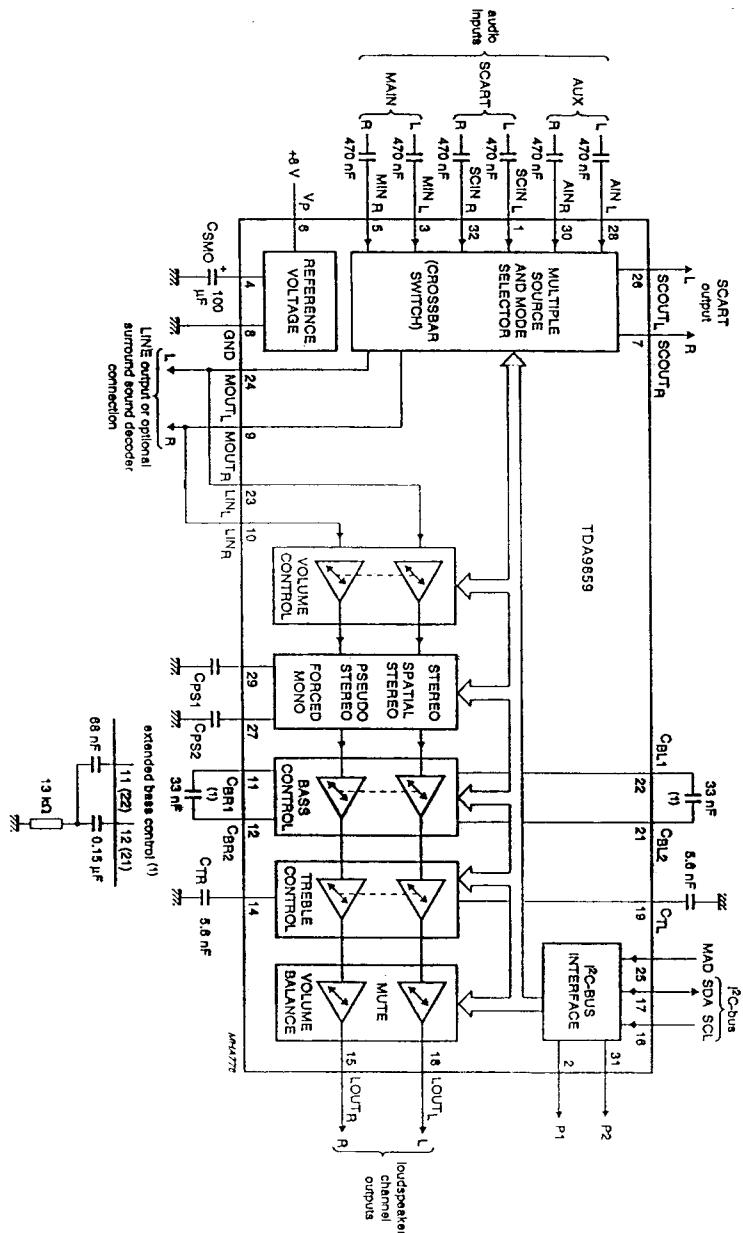
externally

- Two general purpose logic output ports
- I²C-bus control of all functions.

2. General Description

The TDA9859 provides control facilities for the main and the SCART channel of a TV set. Due to extended switching possibilities, signals from three stereo sources can be handled.

3 . Block Diagram



(1) For extended bass control the capacitor between C_{BRL1} and C_{BRL2} should be replaced by the extended bass control network.
Fig. 29 Block Diagram and Application Circuit.

4. Refer to Table 23 about Functions and Service Data of the IC's Pins.

TDA9178**YUV One Chip Picture Improvement Based on Luminance Vector-, Color Vector- and Spectral Processor****1. Features**

- Picture content dependent non-linear Y , U and V processing by luminance histogram analysis
- Variable gamma control
- Adaptive black and white stretch control
- Skin tone correction
- Green enhancement
- Blue stretch
- Luminance Transient Improvement (LTI)
- Smart peaking for detail enhancement
- Color Transient Improvement (CTI)
- Scan Velocity Modulation (SCAVEM) output
- Line Width Control (LWC)
- Video Dependent Coring (VDC)
- Color Dependent Sharpness (CDS)
- Noise measurement
- Feature Mode (FM) detector
- Cue Flash (CF) detector
- Three additional pins for access to 6-bit ADC and I²C-bus
- Adjustable chrominance delay
- TV standard independent
- I²C-bus controlled
- 1f_H and 2f_H
- Demonstration Mode (DEMO).

2. General Description

The TDA9178 is a transparent analog video processor with YUV input and output interfaces. It offers three main functions: luminance vector processing , color vector processing and spectral processing. Beside these three main functions, there are some additional functions.

In the luminance vector processor, the luminance transfer function is controlled in a non-linear way by the distribution, in 5 discrete histogram sections, of the luminance values measured in a picture. As a result, the contrast

ratio of the most important parts of the scene will be improved. Black restoration is available in the event of a set-up in the luminance signal.

A variable gamma function, after the histogram conversion, offers the possibilities of alternative brightness control or factory adjustment of the picture tube.

The adaptive black stretch function of the TDA9178 offers the possibility of having a larger 'weight' for the black parts of the video signal, the white stretch function offers an additional overall gain for increased light production.

To maintain a proper color reproduction, the saturation of the U- and V-colour difference signals is also controlled as a function of the actual non-linearity in the luminance channel.

In the color vector processor, the dynamic skin tone correction locally changes the hue of colors that match skin tones to the correct hue. The green enhancement circuit activates medium saturated green towards to more saturated green. The blue stretch circuit can be activated which shifts colors near white towards blue.

The spectral processor provides 1D luminance transient improvement, luminance detail enhancement by smart peaking and a 1D color transient improvement.

The TDA9178 can be used as a cost effective alternative to (but also in combination with) scan velocity modulation.

In the spectral processor line width control (or aperture control) can be user defined. The TDA9178 is capable of adjusting the amount

of coring according to the video level with the video dependent coring. The TDA9178 is also capable to give extra sharpness in the cases of saturated red and magenta parts of the screen using the color dependent sharpness feature.

An embedded noise detector measures noise during the field retrace in parts which are expected to be free from video or text information. With the noise detector a variety of 'smart noise control' architectures can be set up.

A feature mode detector is available for detecting signal sources like VCR (in still picture mode) that re-insert the levels of the retrace part. For this kind of signals the noise measurement of the TDA9178 is not reliable. An output signal (on the I²C-bus and on a

separate pin) is available that detects when the picture content has been changed significantly, called cue flash.

An embedded 6-bit ADC can be used for interfacing three analog low frequency voltage signals (e.g. ambient light control or beam current voltage level) to the I²C-bus.

In the demonstration mode all the features selected by the user are automatically toggled between on and off.

The TDA9178 concept has a maximum flexibility which can be controlled by the embedded I²C-bus. The supply voltage is 8 V. The device is mounted in a 24-lead SDIP package, or in a 24-lead SO package.

Table 11 Pinning

symbol	Pin	Description
SC	1	Sandcastle input
n.c.	2	Not connected
ADEXT1	3	ADC input 1
ADEXT2	4	ADC input 2
ADEXT3	5	ADC input 3
YIN	6	Luminance input
ADR	7	Address selection input
UIN	8	U signal input
VIN	9	V signal input
TP	10	Test pin
SCL	11	Serial clock input (I ² C-bus)
n.c.	12	Not connected
n.c.	13	Not connected
SDA	14	Serial data input/output (I ² C-bus)
DEC _{DIG}	15	Decoupling digital supply
VOUT	16	V signal output
UOUT	17	U signal output
V _{EE}	18	Ground
YOUT	19	Luminance output
V _{CC}	20	Supply voltage
SOUT	21	SCAVEM output
CF	22	Cue flash output
n.c.	23	Not connected
n.c.	24	Not connected

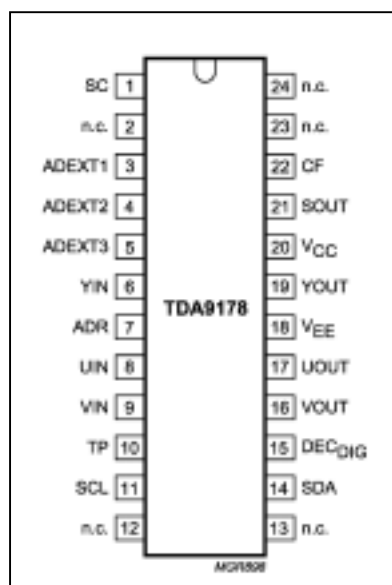


Fig. 30 Pin Configuration (SOT137-1).

3 . Block Diagram

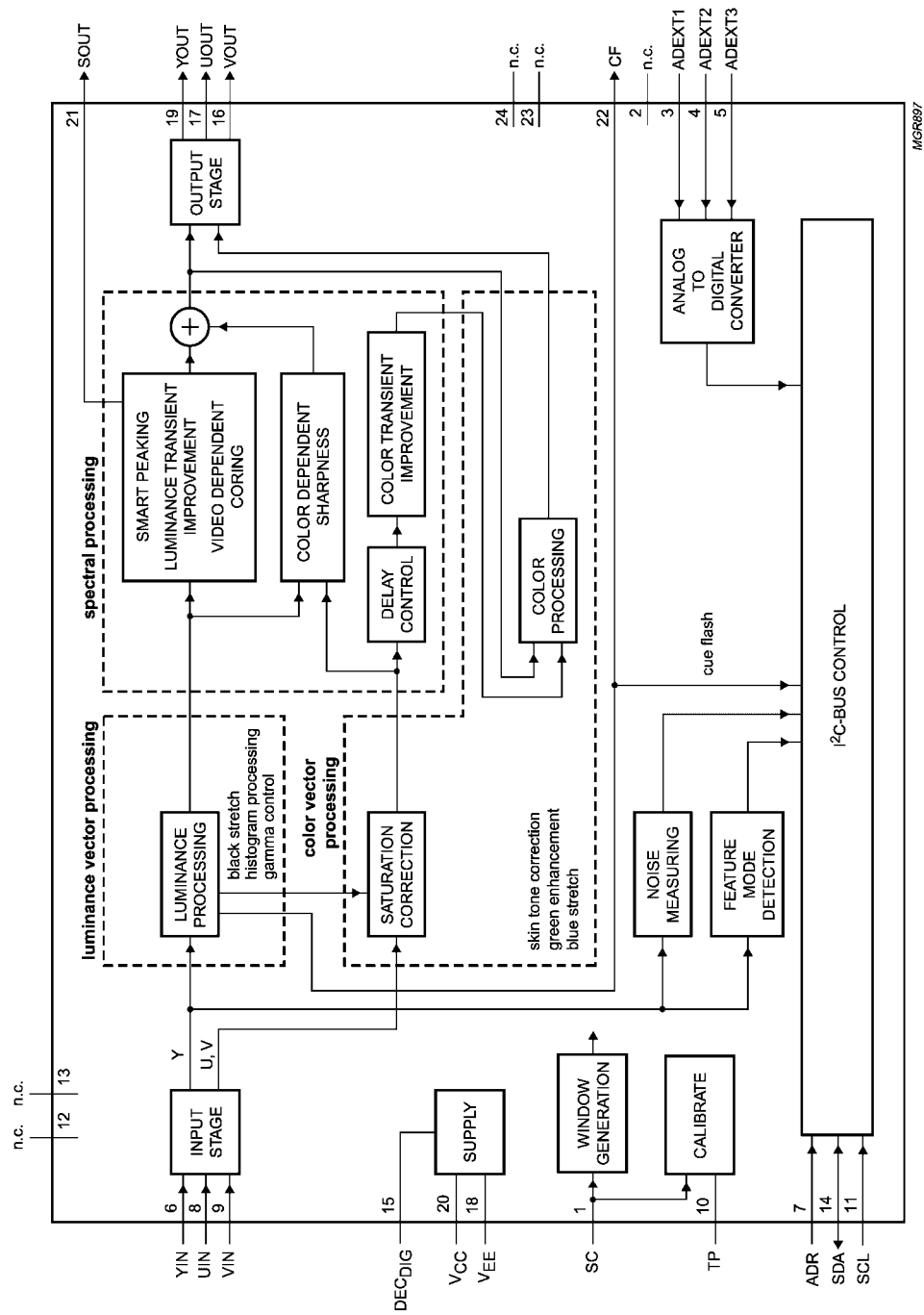


Fig. 31

Service Data of Key IC's

Table 12 Functions and Service Data of TDA4605(N811)'s Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (K)	Negative Resistance (K)
1	Regulation control	0.4	0.713	0.4
2	Primary current input	1.34	9.71	1.34
3	Primary voltage monitoring input	1.91	7.09	1.91
4	Ground	0	0	0
5	Drive pulse output	4.08	0.84	4.08
6	Supply voltage	0.74	16.35	4.9
7	Soft-start	2.36	8.69	6.19
8	Zero crossing input detection	0.33	6.72	5.94

Table 13 Functions and Service Data of S3P8849XZZ/ CH12T1007(N001A)'s Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (20K)	Negative Resistance (20K)
1	VT	0.5	103	105.
2	EMC	0	1500	1120.
3	KAV1	0	25.4	25.4
4	KAV2	0	25.5	25.5
5	KAV3	0	25.8	25.8
6	L	4.8	14.3	14.3
7	H	4.8	14.3	14.3
8	U	0	1380	1100.
9	KEYB1	4.8	13.4	13.4
10	KEYB0	4.8	13.4	13.4
11	SCL1	4.8	7	6.8
12	SDA1	4.8	7	6.8
13	GND	0	0	0
14	NC			
15	SYS0	0	26	25.3
16	SYS1	3.8	26	25.3
17	STDBY1	4.8	25.6	25.6
18	BASS-SW	3.5		156
19	S-SW	0	20	20
20	Y/C	0	1300	1000
21	HALFTONE	0	25.6	25.6
22	R	0	2.1	2.1
23	G	0	2.1	2.1
24	B	0	2.1	2.1
25	FB	0	2	2
26	HD	3.8	5.5	2
27	VD	4.8	8.7	8.4
28	OSC1	4.8	1300	1000

(continued)

No.		Reference Voltage (V)	Positive Resistance (20K)	Negative Resistance (20K)
29	OSC2	4.8	1300	1000
30	TEST	0	0	0
31	XIN	1.7	1500	1100
32	XOUT	1.5	1500	1100
33	RESET	4.8	12.2	12.1
34	VCC	4.8	3.4	3.4
35	P/N	0	1500	1100
36	RMT	4.8	20.4	20
37	GND	0	0	0
38	MUTE	4.8	25.7	25.6
39	W/R	3	25.7	25.6
40	SCL	3.5	6.8	6.8
41	SDA	3.5	6.8	6.8
42	STANDBY	0	8.2	8.1

Table 14 Functions and Service Data of AT24C08-10P (N002)'s Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (20K)	Negative Resistance (20K)
1	Address input	0.00	0.00	0.00
2	Address input	0.00	0.00	0.00
3	Address input	0.00	0.00	0.00
4	Common ground	0.00	0.00	0.00
5	Clock line	4.94	6.85	4.83
6	Data line	4.94	6.89	5.15
7	PW write protect	4.94	9.58	6.31
8	Supply voltage	4.94	3.5	3.25

Table 15 Functions and Service Data of OM8839PS (N301)'s Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (20K)	Negative Resistance (20K)
1	SIF signal input	0.00	8.8	6.03
2	External audio signal input	3.61	8.69	6.03
3	Reference frequency resonant coil terminal	0.00		
4	Reference frequency resonant coil terminal	0.00		
5	PLL filter	2.45	8.54	5.79
6	Video detection output	2.77	2.19	2.19
7	Clock line	3.85	6.88	4.56
8	Two-way transmission data line	3.91	6.87	4.56
9	Gap decoupling	6.62	7.57	5.66
10	SVHS chroma signal input	1.37	8.65	5.99
11	SVHS luminance signal input	3.85	8.65	5.88
12	Supply voltage	8.22	2.09	2.09
13	Composite video signal input terminal	3.69	8.65	5.88
14	Ground	0.00	0.00	0.01

(continued)

SERVICE MANUAL

15	Audio signal output	401	8.74	5.96
16	Decoupling capacitor connection	0.02	∞	∞
17	Video input	3.35	8.65	5.88
18	Black current control input	5.87	8.73	5.81
19	Blue (B) signal output	2.36	5.74	5.08
20	Green (G) signal output	2.41	5.74	5.08
21	Red (R) signal output	2.39	5.74	5.08
22	Beam current control	1.77	7.87	5.84
23	Red (R) signal input	3.62	8.61	5.95
24	Green (G) signal input	3.63	8.61	5.95
25	Blue (B) signal input	3.61	8.61	5.95
26	Selectable primary color signal input control	0.07	0.99	0.99
27	Luminance signal input	2.54	6.84	5.83
28	Luminance signal output	2.54	6.91	5.92
29	B-Y color difference signal output	2.35	6.89	5.9
30	R-Y color difference signal output	2.35	6.9	5.9
31	B-Y color difference signal input	2.36	6.8	5.93
32	R-Y color difference signal input	2.35	6.84	5.93
33	Sub-carrier output for SECAM demodulation	4.23	6.68	5.82
34	3.58MHz crystal oscillator	2.56	7.87	5.91
35	4.43MHz crystal oscillator	2.56	7.87	5.91
36	APC low pass filter	4.95	8.75	5.9
37	Horizontal starting supply voltage	8.22	2.09	2.09
38	Composite video output	2.54	7.32	5.96
39	Black level stretch	4.86	8.68	4.69
40	Line drive pulse output	0.38	2.82	2.81
41	Horizontal flyback pulse input/sandcastle pulse output	0.74	8.81	5.75
42	Line discriminator	3.33	8.44	5.87
43	Line discriminator	3.89	8.75	5.87
44	Ground	0.00	0.00	0.00
45	Vertical frequency parabola output	0.14	8.83	5.89
46	Field drive signal output	2.3	8.8	5.82
47	Field drive signal output	2.34	8.8	5.8
48	IF signal input	4.55	8.23	6.05
49	IF signal input	4.55	8.21	6.05
50	High voltage detection input	2.01	7.68	5.95
51	Vertical sawtooth generation	3.72	8.35	5.91
52	Vertical reference bias setting	3.83	8.33	5.96
53	AGC filter for IF amplifier	4.44	8.72	5.89
54	AGC output for IF amplifier	1.31	10.13	5.69
55	Audio deemphasis	2.86	8.5	5.87
56	Audio decoupling	3.57	8.78	5.89

Table 16 Functions and Service Data of TDA8350Q-N6 (N401)'s Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (20K)	Negative Resistance (20K)
1	Vertical drive input (positive)	2.33	8.82	5.8
2	Vertical drive input (negative)	2.28	8.83	5.83
3	Feedback input	8.52	5.74	4.71
4	Supply voltage	17.23	7.92	4.2
5	Output 1	8.5	5.83	4.71
6	Not connected	0.00		
7	Ground	0.00	0.00	0.00
8	Pump supply voltage input	49.31		
9	Output 2	0.00	5.87	4.7
10	Guard output	0.2	8.64	5.88
11	Pincushion output	0.07	9.79	5.24
12	Pincushion input (negative)	2.43		6.97
13	Pincushion input (positive)	2.91		6.88

Table 17 Functions and Service Data of TDA7057AQ (N601)'s Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (20K)	Negative Resistance (20K)
1	Volume control input	0.95	6.85	6.15
2	Not connected	0.00		
3	Audio R signal input	2.38	12.59	6.51
4	Supply voltage	17.48	0.47	0.47
5	Audio L signal input	2.37	12.5	6.51
6	Ground	0.00	0.00	0.00
7	Volume control input	0.95	6.85	0.15
8	Left channel in-phase signal output	8016	6.46	5.59
9	Ground	0.00	0.00	0.00
10	Left channel inverting signal output	8.25	6.46	5.59
11	Right channel inverting signal output	8.24	6.46	5.59
12	Ground	0.00	0.00	0.00
13	Right channel in-phase signal output	8.13	6.46	5.59

Table 18 Functions and Service Data of TDA6108JF/TDA6107Q's Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (20K)	Negative Resistance (20K)
1	G inverting input	3.33	5.32	4.72
2	R inverting input	3.26	5.32	4.72
3	B inverting input	3.28	5.32	4.72
4	Ground	0.00	0.00	0.00
5	Black level current input	6.03	18.65	5.65
6	Supply voltage	199		4.48
7	B output	69.9		5.45
8	R output	69.18		5.45
9	G output	65.9		5.45

Table 19 Functions and Service Data of HEF4052 (N602)'s Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (K)	Negative Resistance (K)
1	Signal input	0	12.52	6.46
2	Signal input	0	12.5	6.46
3	Signal input	0	12.52	6.46
4	Signal output	0	12.43	6.25
5	Signal input	0	12.5	6.46
6	Ground	0	0	0
7	Ground	0	0	0
8	Ground	0	0	0
9	Control signal input	4.98	7.8	5.6
10	Control signal input	4.98	7.8	5.6
11	Control signal input	0	0	0
12	Signal input	0	0	0
13	Signal output	0	0	0
14	Signal input	0	0	0
15	Audio output	0	12.48	6.46
16	Supply voltage	5.09	6.89	4.44

Table 20 Functions and Service Data of HEF4053 (DS01/02/NP02)'s Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (K)	Negative Resistance (K)
1	Signal input	0	9.81	6.15
2	Signal input	0	0	0
3	Signal input	0	9.81	6.15
4	Signal output	0	6.66	6.21
5	Signal input	0	0	0
6	Ground	0	0	0
7	Ground	0	0	0
8	Ground	0	0	0
9	Control signal input	0.12	7.97	5.7
10	Control signal input	0.12	7.99	5.7
11	Control signal input	4.98	7.8	5.6
12	Signal input	0	0	0
13	Signal output	0	9.81	6.15
14	Signal input	0	6.9	6.4
15	Audio output	0	6.95	6.4
16	Supply voltage	5.09	6.89	4.44

Table 21 Functions and Service Data of TD7056B (NW01)'s Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (20K)	Negative Resistance (20K)
1	Not connected	0		
2	Positive supply voltage	16	0.4	0.4
3	Voltage input	2	7.4	33
4	Signal ground	0	0	0
5	DC volume control	0	7	9
6	Positive output	8	6	7.4
7	Power ground	0	0	0
8	Negative output	8	6	7.4
9	Not connected	0		

Table 22 Functions and Service Data of TA75558 (NW02)'s Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (20K)	Negative Resistance (20K)
1	A output	3.7	6.4	13
2	A negative input	3.7	7.5	57
3	A positive input	3.7	0.8	0.8
4	Ground	0	0	0
5	B positive input	3.7	0.8	0.8
6	B negative input	3.2	7.5	80
7	B output	3.7	5.6	6.4
8	Supply voltage	7.3	1.1	1.1

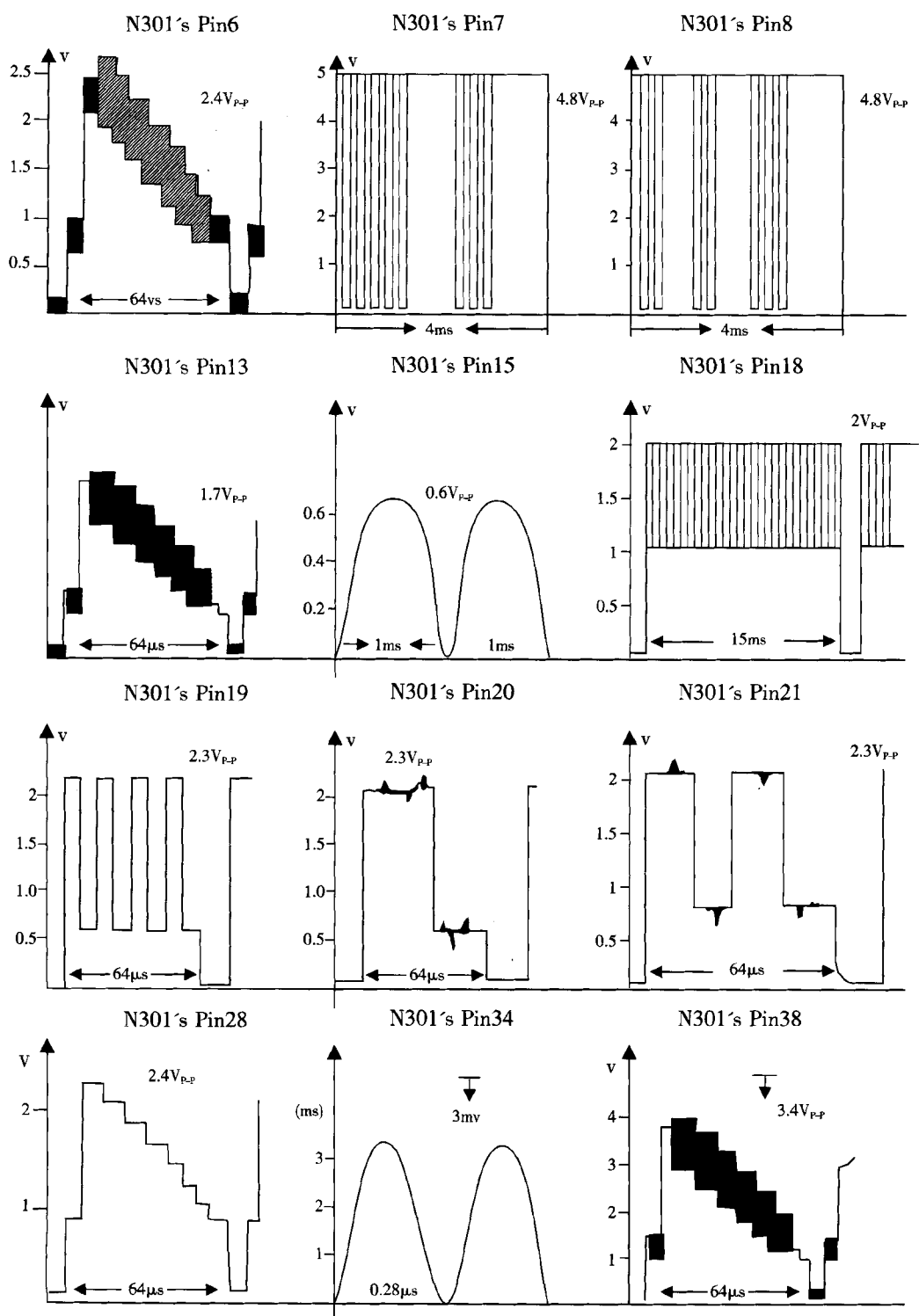
Table 23 Functions and Service Data of TDA9859 (N606)'s Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (K)	Negative Resistance (K)
1	Audio input	4.14	7.62	5.85
2	Output 1	0	7.86	6.26
3	Audio input	4.14	7.61	5.84
4	Reference voltage for filtering capacitor	8.18	7.46	5.94
5	Audio input	4.14	7.62	5.83
6	Supply voltage	8.26	1.62	1.62
7	Audio output	4.15	7.41	5.98
8	Ground	0	0	0
9	Audio output	4.15	7.36	5.79
10	Audio input 8	4.15	7.36	5.79
11	Channel 1 audio compensation	4.15	7.38	6.12
12	Channel 2 audio compensation	4.15	7.61	6.03
13	Audio output 8	0		
14	Treble compensation	4.15	7.48	6.24
15	Audio output	4.13	6.78	5.66
16	Clock line	4.33	7.02	5.25
17	Serial data line	4.53	6.98	5.21
18	Audio output	4.13	6.78	5.65
19	Treble compensation	4.14	7.48	6.24
20	Audio output	0		
21	Bass2 compensation	4.15	7.59	6.04
22	Bass1 compensation	4.15	7.37	6.12
23	Audio input	4.15	7.34	5.77
24	Audio output	4.15	7.34	5.77
25	Mode address selection	0	0	0
26	Audio output	4.15	7.38	5.96
27	Audio compensation 1	4.14	7.64	6.22
28	Audio input	4.14	7.59	5.83
29	Audio compensation 1	4.14	7.61	6.24
30	Audio input	4.14	7.57	5.83
31	Output 2	0	7.84	6.24
32	Audio input	4.14	7.57	5.83

Table 24 Functions and Service Data of TDQ-5B6M (A101)'s Pins

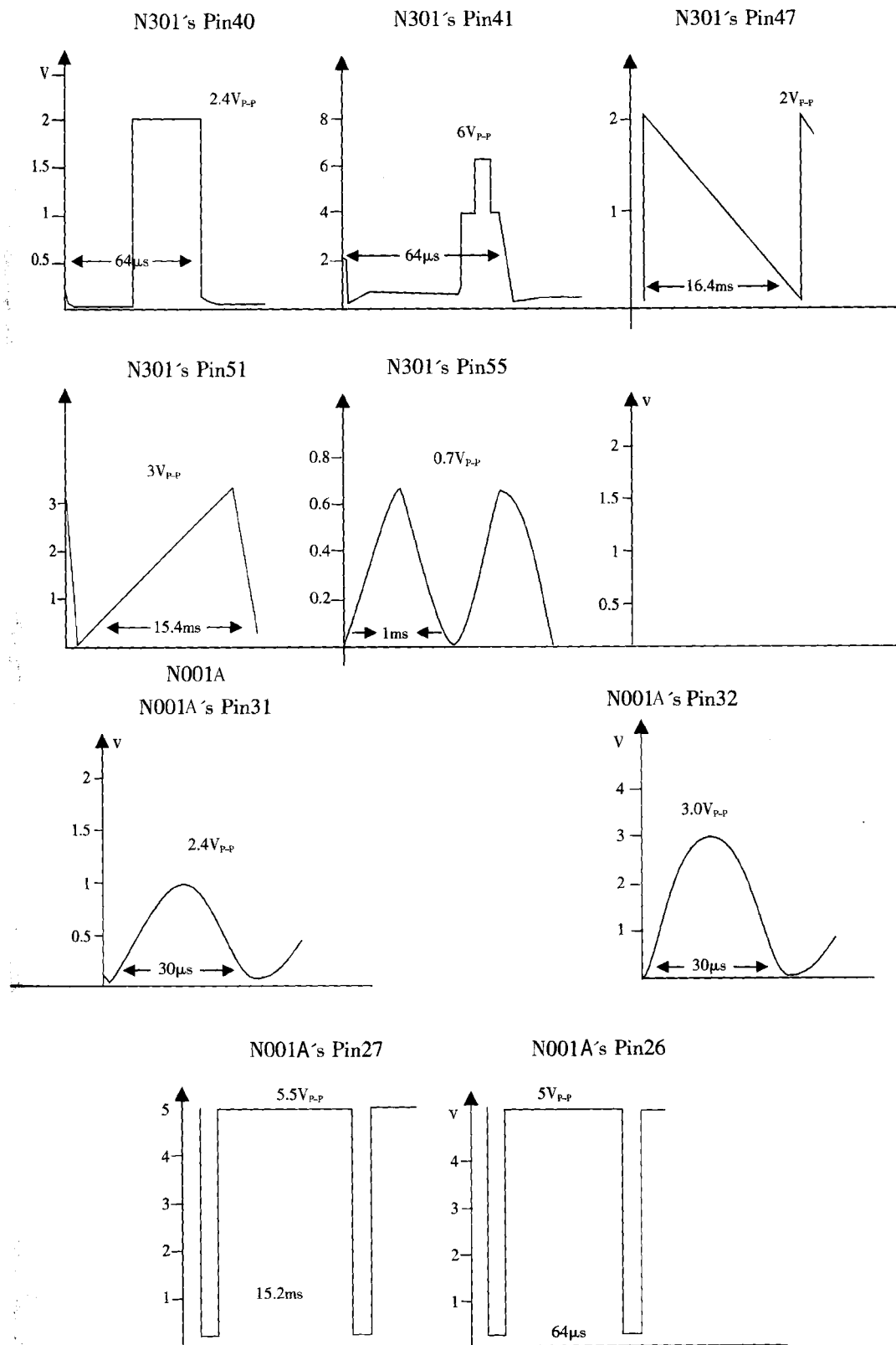
Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (20K)	Negative Resistance (20K)
1	AGC	0.98	9.56	6.04
2	NC	26.73		6.85
3	NC	0.61	9.79	7.39
4	SCL	4.89	9.58	5.13
5	SDA	4.88	9.58	5.12
6	VDD	5	2.2	2.2
7	NC	4.9	2.2	2.2
8	NC	0	0	0
9	BT	30.21		13.07
10	NC	0	0	0
11	IF	0		

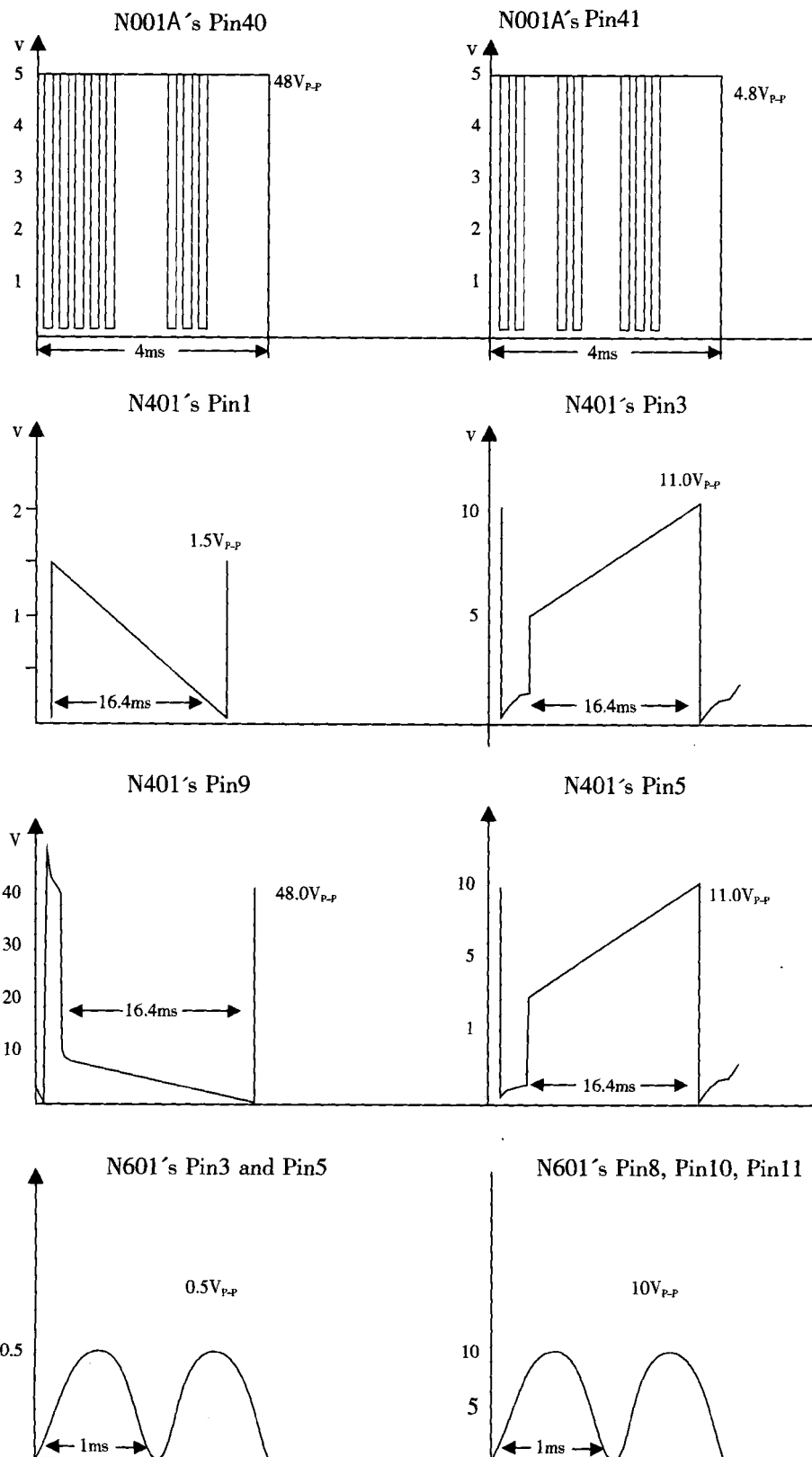
Waveforms of Key ICs



Note:

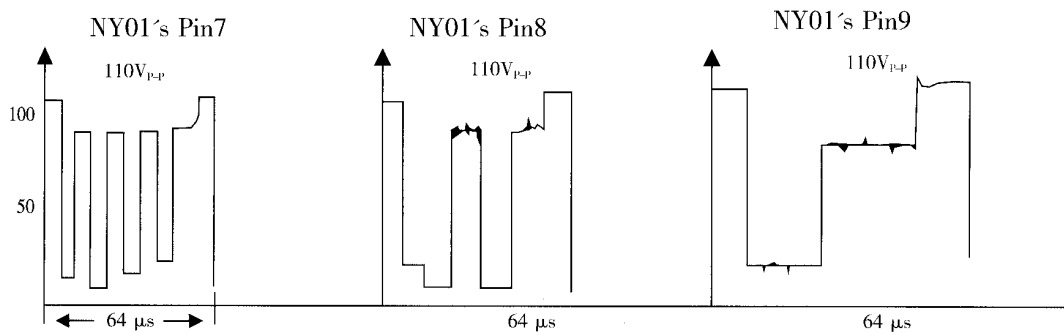
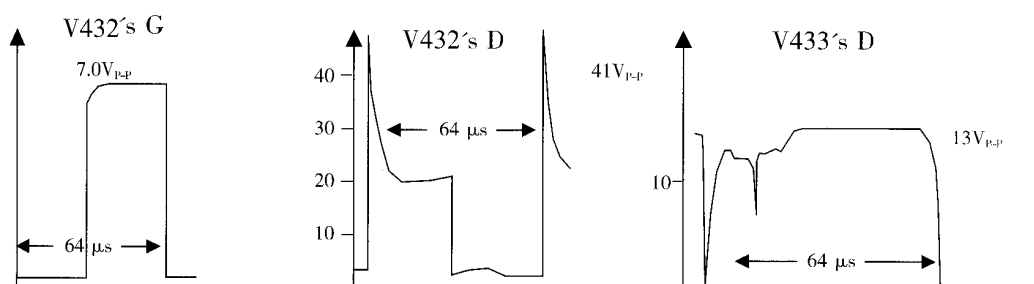
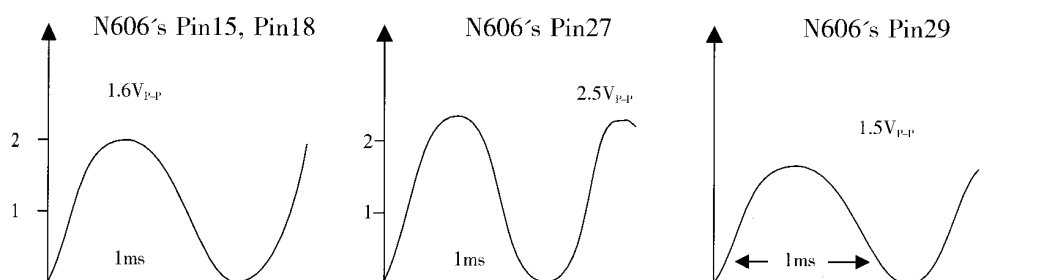
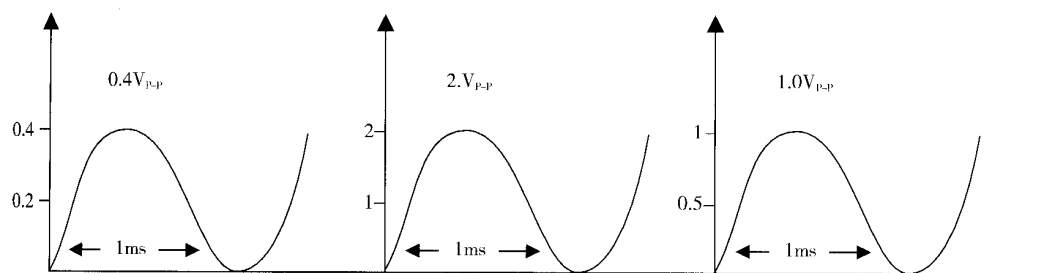
The TV receives NTSC color bar with 1KHz sine wave audio reception in Normal mode when measuring voltage and resistance with a GDM-8145 multimeter (Max. resistance: 20 K Ω , Max. DC voltage :20V).





N606's Pin3, Pin5, Pin7, Pin9 and Pin10 N606's Pin11, Pin12, Pin19, Pin21 and Pin22 N606's Pin14

1



REPLACEMENT OF PARTS

1. Description

Many electrical and mechanical components in this chassis have special safety-related characteristics. Components which have these special safety characteristics in this manual and its supplements are identified by the international hazard symbols or UL, FCC, FDA or VDE marking on the circuit diagram and parts list. When replacing any of these components, substitute the one which has the same safety characteristics as specified in the manual.

Description of the special markings:

A: The components identified by the A marking have special safety-related characteristics.

AE: The components identified by the AE marking are listed by EMC and have special safety-related characteristics.

G: The components identified by the G marking have critical characteristics.

Z: The components identified by the Z marking have important characteristics.